Goldman Sachs Asset Management

Goldman Sachs Growth Equity

Themes, insights, and investment opportunities in global growth

February 2021

contents

Introduction to Goldman Sachs Growth

Goldman Sachs is uniquely positioned at the epicenter of global growth, with vantage points as a banker, advisor, and investor. The firm has also been at the forefront of innovation for many decades, strategizing with the world's largest businesses, and working alongside the most accomplished entrepreneurs and thought leaders. We have served as an important driver of advancement within our own industry, financial services, but have also been an omnipresent resource for all growth sectors, including technology, healthcare, and consumer. Our Investment Banking Division has underwritten the IPOs for thousands of high-growth companies. Our Investment Research Division has been a student of thousands of business models. Our Technology Division has grown to 9,000 engineers, focused on delivering best-in-class digital services to our employees and clients.

Since the 1980s, we have harnessed this wealth of knowledge and experience to deploy the firm's capital into private growth businesses. We have executed on a repeatable model where we leverage the firm's resources to selectively partner with clients early in their lifecycles. In turn, we give our portfolio companies access to our global network to enhance their growth prospects and the pace at which they can scale. Many of our portfolio companies have leaned on Goldman Sachs to help them expand into new regions, develop new products, acquire new customers efficiently, and raise the bar for their boards of directors and management teams.

Goldman Sachs Growth is the product of our combined principal investing activities. In 2019, we integrated our global growth equity investment activities—which had previously operated as three independent teams—to create a unified growth equity platform within the Merchant Banking Business. Over the past year, we have begun to experience the synergies that we envisioned from this integration: increased diversity of backgrounds and skillsets, optimized use of internal resources and know-how, and a coordinated global sourcing and pipeline development effort. The GS Growth team represents one of the largest dedicated growth equity investment organizations in the industry, including more than 75 investors globally, 200-plus portfolio comp-anies, and billions in capital invested.

The GS Growth portfolio is diversified across regions (48 percent US, 37 percent Asia, 14 percent EMEA) and sectors (33 percent enterprise tech, 17 percent fintech, 30 percent consumer, 12 percent healthcare, 8 percent other). Looking forward, our portfolio companies and investors are positioned to benefit from powerful secular demand drivers that are transforming the global economy.

We believe the world is at a unique moment in time, standing at the beginning of a multi-decade period of unprecedented technological advancement. We are excited to have brought our growth equity teams together to support the exceptional entrepreneurs who are driving this innovation and transforming the global economy.

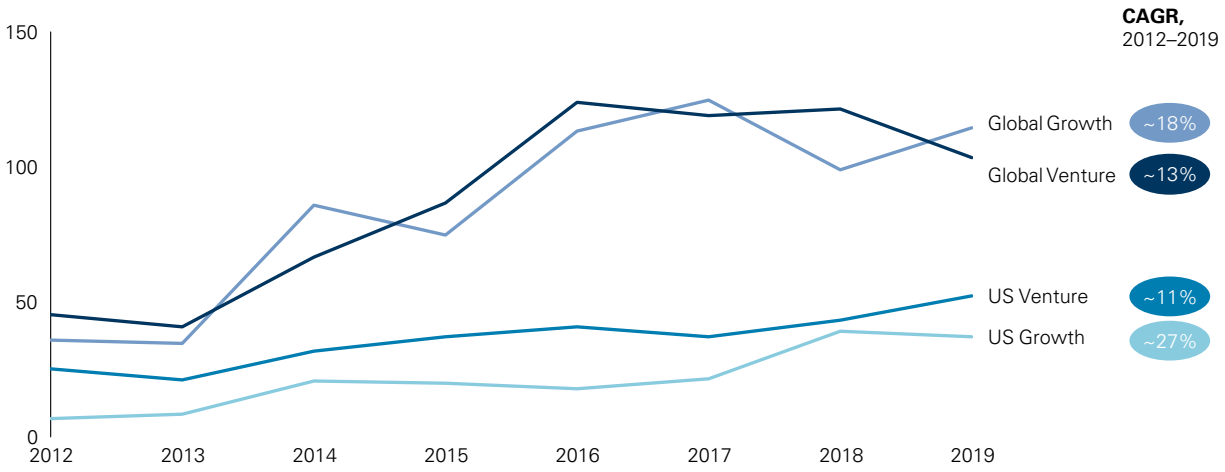
Thematic investing is core to the GS Growth strategy, as it will provide a framework and foundation for the way in which we source and underwrite future investments. Here, in our inaugural thematic white paper, we will discuss our favorite global investing themes across the fintech, enterprise technology, consumer, and healthcare sectors.

We believe the time to execute is now. The surge in venture capital funding from 2012-to-2019 has supported hyper-growth companies that are now beginning to scale (Exhibit 1).

Exhibit 1

There has been a surge in venture capital and growth equity funding from 2012 to 2019

VC and growth equity funding, US and global, 2012–2019, USD Billion



Source: Preqin Ltd.

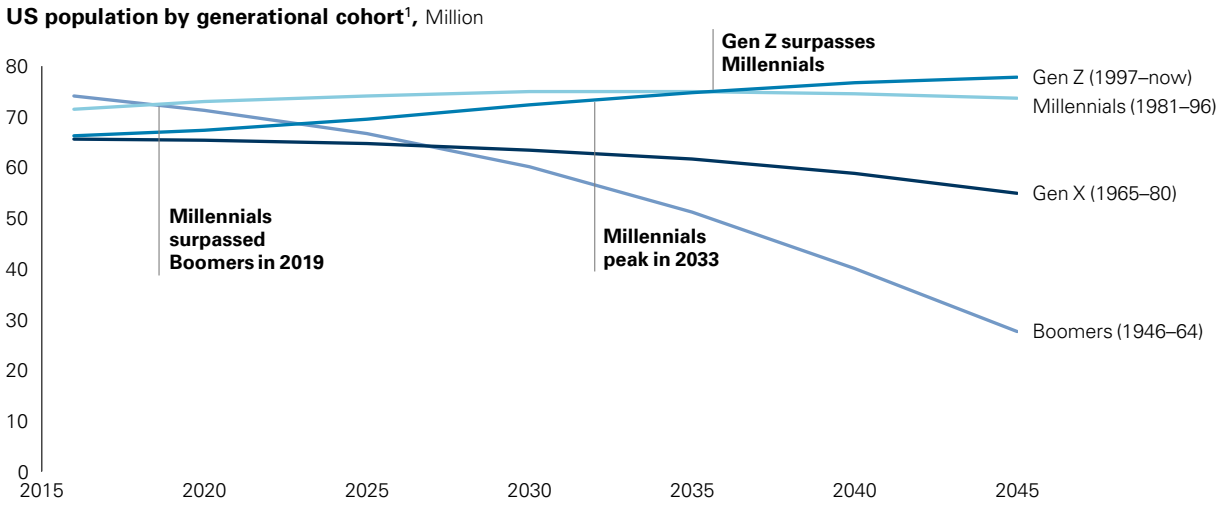
Driving our investing themes is a convergence of powerful global macro-trends that are impacting all elements of human life across economic, political, social, and environmental disciplines. These macro-trends are driven by technology, demographics, and market forces, and are accelerating the pace of disruption across many industries and all geographies.

Technology macro-trends combine innovations such as open source software, cloud computing, machine learning (ML), and application programing interface (API) software (which enables applications to interoperate). Together, these reduce time to market, and enable higher returns for growth companies across sectors. Talented entrepreneurs have harnessed the power of these transformative technologies and the rise in smartphone penetration (from 6 percent to 49 percent globally in the past decade), and broadband expansion (from 500 million subscribers to 1.2 billion) to build platforms and applications that unlock the power of the internet for consumers worldwide.

Additionally, there has been a significant shift in population demographics, specifically the emergence of the digitally native consumer, as Millennials surpassed Baby Boomers in 2019 (Exhibit 2). This shift is affecting all consumer-facing industries, as consumers increasingly prefer digital business models. Regional demographic trends have also affected consumer dynamics. For example in China, growth across industries has been driven by increased domestic demand, as real private consumer spending more than doubled from $2.6 billion in 2009 to close to $5.6 billion in 2019.

Exhibit 2

Millennials became the largest generation in 2019 and are expected to remain the largest until 2035



1. Not showing other population segments, including the "Silent" generation (born after 1928) and future generation born after 2012. The end year for Generation Z has been defined as 2012. Forecast includes projected immigration

Source: PEW Research Center; US Census

Beyond the consumer sector, we believe this demographic shift will also impact many other sectors. For instance, it will affect the way employees function in the workplace, such as how doctors monitor patients, and how engineers write software.

Lastly, the COVID-19 global pandemic has pulled forward technology adoption through the acceleration of ecommerce penetration, the embracing of virtual environments and remote interactions, and the increased value proposition of workplace automation and cloud environments. In the US, it is estimated that e-commerce penetration leaped ten years ahead in less than three months. It took 10 years to move from 5.6 percent in 2009 to 16 percent in 2019, and reached 33 percent in April 2020. This trend is also evident in China, which already has the largest online retail market (at over $1.5 trillion), and for which e-commerce penetration is estimated to have jumped from 30 percent in 2019 to over 40 percent in 2020, with COVID-19.

Sector themes make us excited to deploy capital. The macro-trends in technology adoption, demographic composition, and marketplaces that we have used to identify our sector themes provide for a long-term investment horizon.

1 | Fintech

1.0 Overview of fintech space

The combination of demographical and technological macro-trends has created a need for—and enabled—the transformation of the financial services sector. Digital innovation is fundamentally reshaping how financial products are created, delivered, and priced. While some financial products and services have reached high digital penetration in select markets (e.g., digital retail banking and equities trading in the US), we believe there is tremendous opportunity for further innovation and digital disruption, and that the market will continue to expand, driven by digitization of more complex financial products (e.g., mortgages, private equity, and fixed income), as well as through the conversion of the unbanked and underbanked populations. Capital is flowing into high-growth disruptive business models that democratize access and provide superior services, with compelling unit economics. At the same time, incumbents, eager to keep up, are investing in improving their own digital capabilities and customer experience, fueled by a major reinvestment cycle as they depreciate legacy infrastructure and build new platforms.

We highlight three main themes that will provide long-term growth opportunities in the fintech sector: 1) digitizing more complex, illiquid, and inefficient financial products (e.g., mortgages) and asset classes; 2) the transformation of traditional financial institutions; and 3) embedding of financial services such as payments and lending within existing software and e-commerce solutions of non-financial companies. We will also focus on how these themes are playing out in unique ways in Asia, where the pace of change is even faster.

1.1 Continued digitization of financial products and asset classes

The digitization of financial products, and the tools for accessing and trading them, is a central tenet behind GS Growth's fintech investment strategy. The digitization wave is occurring across all financial products, whether they are consumed by retail customers, small and medium enterprises (SMEs), or large institutions and asset managers.

The first wave of this digitization happened over the past two decades, mostly covering standardized products, such as US cash equities and government bonds, as well as everyday consumer products such as payments, loans, auto and renter's insurance, and brokerage services. This has profoundly impacted the financial services industry, in many cases dramatically changing business models, fee structures and the provider landscape, and creating billions of dollars of shareholder value for the companies leading those transformations.

Goldman Sachs has been at the epicenter of this first wave. GS Growth was a lead investor in exchanges and trading platforms that spearheaded the electronification of the equities, fixed income, FX and commodities markets. The firm also built and launched two digital-first business lines. The first, Marcus, is a direct bank that offers loans, credit cards, and deposit products to consumers. The second is an API-driven transaction banking offering for corporate clients. In both of these businesses, the firm uses a combination of technology built in-house and partnerships with best-in-class external fintech vendors.

We believe that the digitization wave will continue, and spread to financial products that are increasingly more complex and have higher ticket sizes. This will be enabled by three factors: 1) an ever-demanding consumer who wants a delightful experience across all financial products, 2) increasing abilities to harness and analyze disparate datasets to underwrite and serve customers, and 3) the size and inefficiencies of these markets, offering opportunities for significant value creation. Exhibit 3 identifies some of the markets that we believe will become increasingly digital over the next decade.

Exhibit 3

Consumer

- Mortgages and HELOCs
- Home purchase assistance (fractional ownership, rent-to-own)
- Life and health insurance
- Homeowners and catastrophe insurance
- Alternative assets (PE and hedge funds, direct private investing, art, collectibles)
- Retirement solutions
- Under-served populations (students, underbanked, thin-file, elderly)

SME and commercial

- SME lending
- Commercial insurance
- Trade finance
- Equipment finance
- Treasury and liquidity solutions

Capital markets

- OTC derivatives
- Alternative assets and fund management
- Crypto-currencies

GS Growth's investment in Better Mortgage is a manifestation of this trend. Better is reengineering and digitizing the mortgage process, making the entire home-buying experience faster and more affordable. The US mortgage market, with $2 trillion of annual originations in 2019, is highly fragmented and antiquated. The legacy technology stacks of incumbent companies require significant manual labor to originate a mortgage, leading to high costs and a poor user experience. This created an opportunity for Better to disrupt the market and gain significant share through digitization, eliminating commissions, fees, unnecessary steps, and branch appointments. To streamline fragmented real estate transactions, Better offers customers access to four products critical to the homeownership journey: mortgage, title insurance, homeowners insurance, and a trusted real estate agent.

Better's rise as a leading online lender comes at a time when 73 percent of American consumers are embracing fintech as the "new normal," with 67 percent reporting a plan to continue managing most of their finances digitally after COVID-19.

We see a similar role for technology and digitization to address liquidity in the private equity market. This is important for several reasons. Global private equity net asset value has multiplied eight times since 2000, almost three times as fast as the capitalization of public markets. At the same time, trading volumes[1] are around 60 times higher in the public markets compared to private market deal values, demonstrating an enormous gap in liquidity. Moreover, companies are staying private for longer periods, leading to pent-up demand for liquidity from sellers (founders, employees, investors) and buyers (seeking access to pre-IPO companies).

Carta is one such growth company tackling this space. We backed Carta with the conviction that it is best positioned to digitize private markets, one of the few asset classes yet to be digitized. Carta develops software solutions targeted to private companies, to alleviate the complexity associated with capitalization table management (originally managed by lawyers on spreadsheets), equity issuance processes (originally issued in physical certificates) and 409A valuations (of employee stock grants and deferred compensation). By alleviating and digitizing these pain points, Carta has built a powerful network of more than 1 million shareholders and more than 16,000 companies (about 30 percent of all US venture-backed companies). It is progressively becoming the system-of-record for asset ownership and the core provider of private markets infrastructure.

[1] As measured in cash equity value of share trading, for trades registered through electronic order book

We are excited for what is coming next as Carta launches CartaX, a private markets exchange that will enable liquidity for investors and employees of Carta's companies in a seamless and compliant manner. We expect CartaX to play a key role in electronifying private markets, similar to how BATS/Direct Edge, Tradeweb, and FXall contributed to digitizing markets for US equities, interest rates, and FX, respectively.

iCapital is another GS Growth portfolio company, focused on improving access to the alternatives market. iCapital's platform allows advisors, and their high-net-worth clients, access to the leading private equity and hedge funds in the world. This enables retail investors to better diversify their portfolios, and allows funds to open their strategies to retail customers without managing thousands of individual limited partners. Since launch in 2013, iCapital has grown rapidly, and now supports $65 billion in assets across 694 funds.

In 2018, Goldman Sachs spun-off SIMON Markets, a technology solution providing wealth advisors with education, analytics, and lifecycle management for structured investments. The spin-off enabled Simon to become a multi-issuer and accelerate its expansion. Today, Simon helps thousands of advisors understand and manage a variety of risk-managed solutions for their retail clients.

Raisin is a GS Growth investment creating a digital pan-European marketplace for deposits. Consumers traditionally use saving products from their primary bank. However, deposit interest rates vary significantly, both within and across countries. Raisin's integrations with more than 100 partner banks help consumers access favorable interest rates across Europe, while benefitting from the safety net of deposit insurance systems. Likewise, Raisin helps banks diversify their funding base by sourcing deposits from consumers that a bank would have historically found difficult to access—for example, due to geographic barriers or lack of a primary banking relationship.

Another GS Growth investment, Nutmeg, provides low-cost and transparent discretionary investment management services in the UK (i.e., portfolios managed by an investment professional). By allowing people with as little as £100 to invest in portfolios tailored to their goals, risk profile, and preferred investment style, Nutmeg offers broad access to high-quality wealth management that is typically available only to high-net worth investors. The company now serves more than 100,000 customers, representing more than £2.5 billion in assets under management.

1.2 Enabling digital transformations of financial institutions and insurance companies (banking-as-a-service and financial services software)

The fintech boom over the past two decades has resulted in what is likely the most intense competitive landscape for financial services in history, with traditional incumbents facing competition from many angles. Universal banks, for instance, have leveraged their scale to become even bigger. Fintech and insure-tech firms collectively raised over $150 billion in capital from 2015 to 2019 worldwide. The competitive landscape in financial services now also includes corporates, such as Apple, Amazon, Google, and Shopify, that are increasingly offering financial products to their customers. While many factors will determine the ultimate market share winners, there are a few capabilities that represent table stakes for any participant in today's financial services market:

- The ability to build and scale multi-disciplinary teams that combine world-class engineering and deep market structure knowledge with digital marketing capabilities, to rapidly launch digital financial products and services that address existing pain points, dramatically improve pricing, and deliver a joyful client experience.
- The ability to integrate new datasets and emerging technologies into each aspect of the product stack (i.e., know-your-customer, fraud, compliance, underwriting, servicing, and customer support).
- The ability to develop sound business models that enable companies to scale their client base efficiently with attractive unit economics, either organically or through channel or funding partnerships.

Firms without these capabilities will face material headwinds, especially because customer loyalty is expected to become increasingly fleeting, given both the competitive landscape and changing demographics. For example, rates of customer attrition are increasing, and churn rates for deposit-holding customers in the US have risen from 7.2 percent in 2017 to 7.9 percent in 2019, and from 5.3 to 5.7 percent in Europe from 2018 to 2019.

Firms with these capabilities will earn higher profits per existing customer. And, as those profit margins increase, these firms will be able to spend more to win customers from competitors, further increasing their scale, and creating a virtuous cycle.

As investors, what interests us is that virtually all financial services market participants will depend heavily on third-party technology providers for these capabilities.

Most banks have consistently increased their third-party spend over the past 10 years as cost pressures, the war for talent, and their legacy systems make it difficult to build these capabilities in house. Fintechs and corporates generally provide a great digital experience for their customers, but do not always have the regulatory licenses, balance sheets, or product expertise for new products, nor can they afford huge technology teams across each of these emerging technologies.

The near universal dependence on third-party digital enablers creates an enormous market opportunity. Globally, banking spend on software reached $100 billion in 2019 and is expected to surpass $110 billion in 2021, and core platform spend is estimated at 15 percent-to-30 percent of that.

The universe of technology providers can be divided into two broad categories. One set of these third-party providers is classified as banking-as-a-service (BaaS). These companies enable their customers to provide various financial products (e.g., mortgages, loans, payments, deposits) with modern, API-driven platforms (enabling applications to interoperate). There are different versions of these BaaS providers. Some provide a digital front-end, integrated into legacy core banking or loan systems. Some provide end-to-end service, including regulatory licenses and balance sheet management. Others provide modern core systems to replace legacy banking systems. All of them allow clients to launch new financial products rapidly, and compete in a digitizing world. This market is expected to reach between $9 billion and $11.5 billion by 2024.

Within the BaaS space, we believe the best-positioned companies are deeply integrated into the major core banking systems, provide comprehensive APIs, and leverage existing bank capabilities (e.g., KYC, fraud, or underwriting), and compliant workflows that reflect complex regulatory requirements. GS Growth has made several investments in this space, across different financial products. Amount enables banks to offer digital lending experiences by providing leading anti-fraud, application, and servicing capabilities that are integrated into the core lending systems. Blue Sage is a next-generation loan origination system, helping lenders originate mortgages with lower costs and fewer errors. Deserve provides a full-stack offering for mobile-first credit cards, providing technology, balance sheet services, servicing and licensing, and the ability to access these services in a modular and API-driven way. Elinvar is a platform allowing wealth and asset managers to digitize their platforms end-to-end. Trulioo is an example of a horizontal service, providing a global identity verification service across financial products, leveraging hundreds of underlying data sources. Vestwell helps investment managers offer a modern 401(k) alternative at significantly lower cost.

We believe there is significant additional opportunity as each of the financial products mentioned in Exhibit 3 becomes increasingly digital. As they do, BaaS providers are well-positioned to help both fintechs and banks compete in these areas.

The second broad category of third-party technology providers offers emerging datasets and new technologies to market participants that they can use across their products and services. Examples of new technologies include machine learning (ML) and artificial intelligence (AI), optical character recognition

(OCR), robotic process automation (RPA), natural language processing, low-code applications, secure messaging and communication protocols, and cyber-security tools. We believe successful companies in this space combine their expertise in these technologies with specific use cases and applications that are cognizant of the unique challenges and regulations faced by the financial industry.

The GS Growth team has a unique perspective to evaluate these companies, and capitalize on this market opportunity. As a global bank, Goldman Sachs has an enormous base of 10,000 engineers who are constantly on the lookout for new and emerging technologies to solve the hardest problems in financial services. The firm is a customer to many of the GS Growth portfolio companies that do this work. They include H2O.AI (machine learning), Automation Anywhere (RPA), Symphony (secure messaging), Solactive (custom index creation), and Unqork (no-code application building).

1.3 Embedding of financial services within software and marketplace solutions

Financial services, led by payments, are merging into what were historically distinct commerce ecosystems. Companies that sell specific products such as point-of-sale software, B2B procurement platforms, or online marketplaces, have done the difficult work of acquiring customers and/or automating a complex workflow. With such tasks completed, they now realize that they are natural gatekeepers for adjacent financial transactions. Their customers simply want to do commerce, not payments, and welcome this integration.

The embedding of financial services significantly increases the addressable market for a number of software and marketplace businesses. Shopify, for example, now earns an estimated 50 percent of its revenues from payments, and over 40 percent of profits, despite being a software solution for merchants to sell online. On the B2B payments side, there is an estimated $67 billion revenue pool, including domestic supplier payments, cross-border supplier payments, and travel & expenses, of which nearly 65 percent is generated by SMEs. This dwarfs the overall profit pool for enterprise software. Lending, whether embedded at the point-of-sale or via supplier financing, offers another largely untapped opportunity. Businesses that succeed in embedding financial services can significantly extend their growth runway.

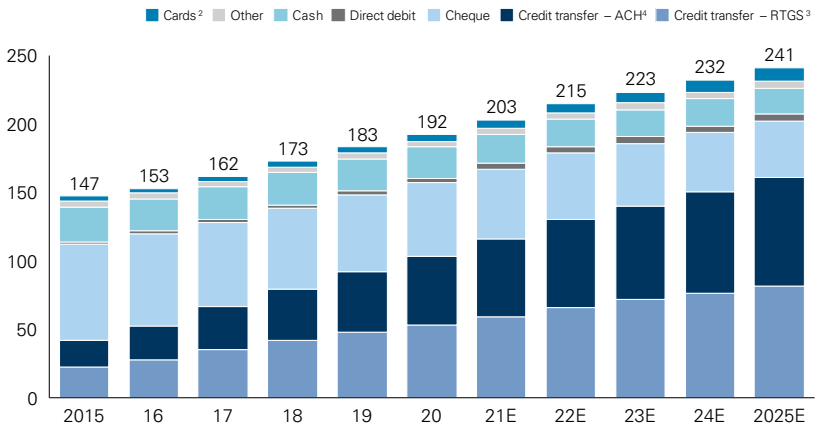
There are several categories of companies that have been embedding financial services:

- Vertical software vendors are embedding payments into broader software suites historically focused on various aspects of business operations and customer interaction. Examples of these solutions include content management systems, point of sale, hospital patient engagement, and scheduling. Integrated software vendors are estimated to serve 15 percent-to-25 percent of SMEs in the US, and 5 percent-to-10 percent in the UK. They are growing at 20 percent per annum.
- Marketplace ecosystems are embedding payments and lending into their checkout experiences, both to increase conversion rates and add monetization vectors. These include B2C oriented marketplaces and marketplace infrastructure (e.g., Amazon, Shopify, BigCommerce, BackMarket), as well as many B2B marketplaces oriented along vertical lines (e.g., Provi in beverages, ACV Auctions in cars). According to McKinsey, ecosystems are expected to account for approximately 30 percent of all global sales by 2025, or $60 trillion. Currently, the share of the top 5 ecosystem players (JD, Rakuten, Alibaba, Amazon and Ebay) accounts for almost 50 percent of all e-commerce transactions.
- B2B "systems of workflow" (accounts payable/accounts receivable automation, procurement, travel & expenses, treasury management). These systems, historically sitting upstream from the actual payments transaction, have been embedding native payment options (e.g., automated clearing house, wire, virtual card) into their software suites. This provides customers with seamless execution and back-end reconciliation, accelerates the shift to digital payments underway in B2B, and allows software vendors to encroach on interchange and foreign exchange profit pools traditionally reserved for banks (Exhibit 4).

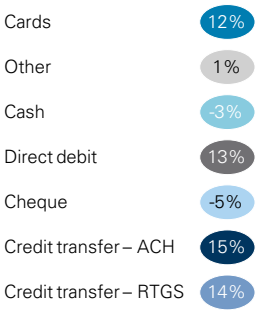
Exhibit 4

The global B2B payments space presents attractive opportunities for disruptors to gain share from traditional banks

Total global payment flows and transaction volume, 2015–2025E, USD trillion[1]



CAGR, 2015–2025E



1. Excludes intracompany and G2G payments Source: McKinsey
2. Includes debit card, credit card, pay-later card and prepaid
3. Real Time Gross Settlements card
4. Automated Clearing Houses

The ability for traditionally non-financial companies to easily embed financial products has been enabled by a new generation of infrastructure tools, such as payment facilitation, card processing, cross-border payments, and data aggregation. Software vendors, marketplaces, and consumer applications can more seamlessly "rent" the infrastructure they need to offer financial services, rather than build it themselves. This is a particular manifestation of the broader banking-as-a-service theme outlined above.

While many embedding companies skew vertical, these infrastructure providers are massively horizontal, with economies of scale. Our team remains active and excited about attractive potential growth equity partners at both ends of the embedded financial services market.

GS Growth portfolio company Flywire is an example of vertical solution that embeds payments into a feature-rich software suite. The company serves the education, healthcare, and travel verticals, all of which have bespoke needs that are poorly served by horizontal platforms. In education, Flywire enables universities to receive payments from foreign and domestic students across several different payment methods. This core payments functionality is embedded within a software suite that includes student engagement, payment plan management, and enterprise resource management (ERP) reconciliation. In healthcare, Flywire embeds out-of-pocket patient payments within a broader patient engagement software suite. The embedding of payments within software has allowed Flywire to offer its customers a superior ROI proposition relative to legacy payment platforms, banks, and enterprise resource planning (ERP) vendors.

GS Growth portfolio company, BentoBox, is another example of a vertical solution that is increasingly embedding payments. BentoBox provides a leading content management system for restaurants. It has leveraged this position to launch online ordering functionality, which positions it to capture payment economics while offering a differentiated service to restaurants and their customers.

1.4 The evolution of fintech in Asia

The fintech themes discussed above are universal globally. In Asia, while the disruptions are similar to elsewhere, they are happening at massive scale, and with regional nuances.

In China, the digitization of consumer-facing financial services has been led by tech giants such as Alibaba, Tencent, and JD. Through their closed-loop ecosystems, these giants have strategically expanded from their core verticals of e-commerce and social media into adjacent services, with the goal of owning most aspects of a consumer's life. As a result, they offer holistic financial services to consumers through their integrated platforms, enabling users to make payments, access financing, or even manage their wealth in a fully digital manner through their smartphones. Given the focus of these giants, and the leapfrogging effect, the adoption of digital financial services has been considerably high among Chinese consumers.

In payments, for example, 81 percent made payments with their smartphones in 2019, with Alibaba and Tencent taking over 90 percent market share. Alternative payment methods in China generated about $43 billion in revenues in 2019, compared to $22 billion collectively for the rest of the world. Ant Financial (an affiliate of Alibaba) and Tencent—because of their dominance as payment gateways—have expanded into a full spectrum of consumer financial services, and have attracted over 1.2 billion users. In 2020, only 40 percent of all transactions in China are expected to be cash-based, compared to 99 percent in 2010.

Asia-Pacific is one of the world's largest insurance markets with over $1.7 trillion gross written premium in 2019, yet it remains highly under-penetrated, especially for health insurance and personalized products. In the past few years, we have seen some insure-tech platforms emerge, mainly focused on innovating the sales process for insurance products, (e.g., offline to online), through more transparent product descriptions. These platforms have seen rapid growth given how underpenetrated and largely sales-driven the legacy providers are. We are starting to see interesting start-ups coming of age in product design innovation, and better price discovery through data analytics. We expect to focus more on the latter type of opportunities given greater barriers to entry than those focused on digital front-ends alone.

Given the prevalence of retail fintech services already offered by these players, we believe opportunities within B2C fintech is limited in China. However, the rest of Asia is much more fragmented, and as yet underpenetrated. We believe opportunities still exist in India and the Asia-Pacific to address the financial needs of a large underbanked population, which is growing in economic clout. For example, while Japan is a mature economy, credit card use remains very low, and GS Growth portfolio company Paidy is enabling buy-now-pay later for e-commerce players.

In China, and Asia at large, the greatest white space in fintech opportunities lies within electronic trading and B2B applications. The adoption of electronic trading is still low across many asset classes. With the advancement in capital markets participation, we expect the financial markets to become increasingly liquid, and transaction workflows to shift towards electronification. GS Growth's portfolio companies, National Stock Exchange of India and Japannext, are examples of companies that are driving the electronification of markets in their countries.

With this backdrop, regulatory reforms are also underway to encourage market transparency and efficient and compliant practices along the trading flow. New regulatory standards—such as requirements for chat history retention in OTC trade communication channels—lead to major increases in adoption of new technological solutions, to ensure compliance and streamline previously inefficient workflows. Examining the impact of regulations (such as Dodd-Frank in the US and MiFID in Europe) on capital markets infrastructure, we believe China's capital markets are at a similar inflection point, primed for technology adoption.

Another area poised for fintech disruption is the market for B2B cross-border capital flows and trade finance, both within Asia and "west to east" corridors. In China for example, it is estimated total cross-border transaction volume reached $53.6 trillion in 2019, up from $43 trillion in 2015. Of that volume, cross-border e-commerce, overseas travel, and overseas education all have strong tailwinds. Traditionally, cross-border money flows have been facilitated primarily by bank transfers and SWIFT, which are often costly and inefficient. Given the advancements in technology and the emergence of new "real-time" payment services in many countries, fintech companies are starting to disrupt the traditional payments industry by providing technology-based end-to-end solutions with superior propositions in cost, efficiency, accessibility, and service quality. Payments is the first step of the value chain, and it paves the way for further value-added services such as trade finance solutions that address the financial needs of cross-border merchants.

Lastly, we see substantial medium-term opportunities in wealth management technologies in Asia. Disruption has not yet come of age due to the still nascent stage of the wealth management ecosystems. However, with financial deepening, and the maturing of the investor base, there is a clear demand for more advanced wealth management solutions. Historically, wealth management products in emerging markets have been relatively limited, including mostly quasi-deposit products with guaranteed returns. These will probably not satisfy the demands of increasingly sophisticated investors in Asia. We expect the wealth management landscape to evolve, with innovations on a few fronts, including wealth management products, digital channels for product distribution, investor education, and data and analytics.

One company that GS Growth has invested in—that is disrupting the Asian financial services space—is Sumscope, a leading technology and data provider for China's onshore fixed income market participants in the price discovery process of various RMB fixed income and derivative products. China's fixed income market is expected to grow under the secular trend of China market liberalization as well as RMB internationalization, with onshore fixed income securities being included in global bond indices. With the deepening of financial markets, there is a need for a more modern, digital means of price discovery to replace the traditional cumbersome process. By deeply embedding its solutions into the fixed income workflow, Sumscope has grown rapidly, and its products are now used by over 6,000 financial institutions that actively trade onshore fixed income products in China as well as other Asian countries. Sumscope has good monetization momentum, and is well-positioned to ride the trend of China bond market expansion. Further upside exists for Sumscope to potentially engage in the cross-border market, and in expanding into other asset classes.

2 | Enterprise technology

2.0 Overview of enterprise tech space

Technology innovations in the areas of cloud computing, open source software, artificial intelligence, robotics, machine learning, and APIs have transformed the enterprise space. They have enabled growth for companies across sectors, and provided them with opportunities to innovate and disrupt. They have also created large-scale challenges for organizations as they digitize and transform their operations and business models. Technology providers can capitalize on both the challenges and opportunities to support companies as they evolve and develop new needs, providing growth platforms for the enterprise technology sector.

We will analyze four main themes that offer high potential for enterprise tech companies to generate value: 1) enterprises moving to the cloud); 2) re-imagining enterprise applications; 3) the digitization of the enterprise; and, 4) protection of the enterprise from cyber threats.

2.1 Moving the enterprise to the cloud

Cloud technology is one of the largest changes to enterprise systems of recent decades, and is helping accelerate the digitization of business. Given its range of enabling capabilities, the cloud's importance continues to grow for enterprise IT leaders. In 2018, around 35 percent of US companies' technology spend was allocated to the cloud and software-as-a-service (SaaS). This share is expected to grow to over 45 percent by 2021. The move to the cloud began with enterprises shifting low-value workloads out of their data centers to gain operational and/or financial efficiencies. Companies such as our portfolio company Skytap have helped bring legacy workloads and applications to the cloud. This was followed by the adoption of hosted SaaS solutions for certain core functions. In recent years though, enterprises have started to move mission-critical workloads into the cloud to gain commercial advantage from the global access and near-limitless capacity that the cloud provides. The cloud is now re-factoring[2] the entire enterprise technology landscape, accelerating the rate of innovation and scale. With it, business models themselves are being re-invented.

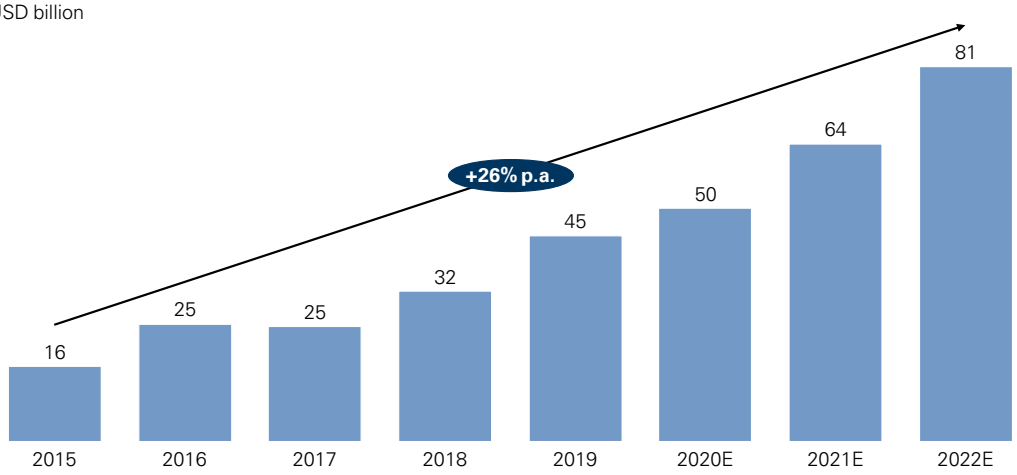
As the cloud matures, infrastructure-as-a-service (IaaS), is expected to generate $81 billion by 2022, up from $45 billion in 2019 (Exhibit 5). The leading providers of IaaS are Amazon Web Services (AWS), Microsoft's Azure, and Google's Cloud Platform, each providing their own marketplace for partners to provide enhanced services. Opportunities will exist in owning the cloud shift from traditional hardware to IaaS, and by investing in the technology that helps clients make that transition (from lifting and shifting workloads, to storing the data, to managing the transition holistically within hybrid cloud environments).

[2] Re-factoring is the process of editing and cleaning the internal structure of software to improve its performance, while preserving its external behavior

Exhibit 5

IaaS has been on a growth path since 2015 and is expected to almost double between 2019 and 2022

Public cloud infrastructure as a service (IaaS) market worldwide from 2015 to 2022,
USD billion



Source: Gartner, August 2020

Today, many enterprise infrastructure stacks are being redesigned to take advantage of the unique characteristics of cloud technology. Renting off-premises capacity instead of owning it allows companies to move these costs from the capital expenditure line to operating expenses, and shift to a model of recurring monthly charges that adjust based on business activity, instead of a large upfront investment. This allows enterprises to become more agile, enabling them to adapt rapidly to the new technology and market needs.

However, the movement of infrastructure to the cloud is still in the early stages, and will be an incremental process for the vast majority of enterprises. Many have begun. In fact, by the end of 2020, around 90 percent of companies will have started to migrate to the cloud in some capacity.

There are unique complexities and challenges for enterprises operating in a hybrid mode as their systems straddle the cloud and traditional datacenters. Some companies such as Pensando, an investment identified and validated by insights from the Goldman Sachs Network Engineering Team, are helping enterprises respond to the unprecedented scale and performance demands by providing them unique cloud-like agility, security, and operational simplicity across their entire infrastructure. Another portfolio company surfaced by our engineering teams, Forward Networks, provides increased visibility and reduced risk of errors and outages by enabling enterprises to document, search, verify, and predict the behavior of the world's largest networks. ScienceLogic and Moogsoft (both GS Growth portfolio companies) are delivering critical visibility and management of an enterprise's hybrid infrastructure from their artificial-intelligence-for-IT-operations (AIOps) SaaS offerings, making systems more predictive and responsive, while ensuring that outages are minimized or avoided altogether. Similarly, Antuit, through its cloud-based, AI-powered SaaS platform, enables unified forecasting and planning solutions, helping transform global supply chains, merchandizing, and sales and marketing functions for consumer product and retail companies.

Nasuni, another portfolio company, is disrupting the enterprise file storage market with a cloud-native approach. Nasuni has developed three novel technologies: the industry's only object storage-based global file system[3] called UniFS, edge caching appliances that deliver a "local-like" end-user performance[4], and a file-locking cloud service[5] to enable global collaboration, ensuring data is always available everywhere at all times. As more processes move to the cloud, there is an increased need for cloud-first solutions for content collaboration, protection, compliance and threat prevention. Egnyte delivers secure content collaboration, compliant data protection, and simple infrastructure modernization, all through a single SaaS platform. Its solution enables businesses to ensure that files are properly routed, shared, and protected across teams. In addition, the platform identifies over-permissioned files and unusual behavior, to safeguard information against insider threats, as well as offering protection from ransomware attacks.

As the cloud infrastructure evolves and matures, enterprises are increasingly finding business advantages by moving and re-architecting their mission critical-applications to the cloud.

2.2 Re-imagining enterprise applications

The cloud had not only changed the way enterprise infrastructure is delivered, it has redefined the competitive landscape. Enterprises can no longer rely on the cost and complexity of custom application development as a business defense. The cloud has reduced the cost of developing and running enterprise applications by orders of magnitude, while simultaneously reducing the delivery timeframes from years to months. By leveraging the cloud and new application architectures, seemingly overnight, startups are now entering increasingly complex industries, forcing enterprises to digitize. In additional to the commercial needs, the daily personal use of high-quality apps and software has also dramatically increased user expectations for the use of B2C and B2B software. Consumers and employees expect an elegant, smooth, and responsive experience while developers are expected to provide a secure, stable and scalable software solution using more than 100 times more underlying code than 10 years ago. This has led to the application becoming the competitive front line for many businesses, making it critical that their DevOps teams have the most agile environment to build any applications, whether that be full stack, low-code or no-code[6]. All these changes are driving the need for new application architectures, tools, and business models.

Modern applications are using a combination of open source and commercial building blocks. We invested in Redis Labs, which is providing commercial-grade in-memory data solutions for the most demanding applications, offering agility and performance that legacy solutions could not easily achieve. GitLab, another portfolio company, is an open core company that develops software for the software development lifecycle of full stack applications. Today, GitLab is used by more than 100,000 organizations, has 30 million registered users, and an active community of more than 3,000 contributors. GS Growth invested in GitLab, following a multi-month engagement and proof-of-concept exercise, during which Goldman Sachs' engineering division chose GitLab's end-to-end continuous-integration/continuous-delivery (CI/CD)[7] DevOps solution to replace what it had built internally. The engineering ROI emerged rapidly. Upon deployment, GS moved from a release cycle of once every 1-to-2 weeks to once every few minutes, with some teams running and merging more than 1,000 CI feature branch builds a day.

Managing this increasingly complex software ecosystem in modern enterprises has also become a significant challenge. Enterprise architecture software company LeanIX—another of our investments—is trying to address this issue by offering a central repository and modelling tool that provides real-time, comprehensive, and consistent information on an organization's IT assets and their interconnections.

[3] Object-based storage is a data storage architecture that uses distinct units called objects that are kept in a single storehouse and not inside other folders. It is cost-effective and scalable, and enables the cloud
[4] Edge caching stores content closer to end-users, allowing them faster access to the content
[5] File locking prevents multiple users from changing a file simultaneously, a vital feature of cloud computing
[6] Low-code and no-code are software development approaches that allow people with little to no knowledge of computer coding to create or tailor applications to their needs, using visual interfaces
[7] CI/CD are agile principles and practices that speed software development, revisions, and releases, by introducing automated testing. These practices also reduce errors and cost

With LeanIX software, users can more effectively manage their IT portfolio, perform impact analyses, (i.e., which processes are impacted by a proposed change), and plan towards a future architectural state.

At times though, full stack development is either too cumbersome or not necessary. This is where low-code and no-code solutions shine.

The impact of low-code. Digital transformation is putting extreme pressure on legacy IT infrastructure, and on traditional ways of building software. These will need to be replaced with more modern applications and architecture. Organizations will increasingly demand platforms that deliver more efficient development, faster deployment, and accelerated change cycles; and address the desire for a better user experience by both customers and employees. This is where AI-powered application platforms come into play, along with low-code or no-code development solutions that allow those without software-writing skills to work on applications.

Modern application platforms such as OutSystems, a GS Growth portfolio company, supplement low-code development tools with additional platform features that bring IT and business together. This enables rapid, iterative, and collaborative development, ensures enterprise-class scale and security, and dramatically speeds up the deployment process with AI-powered automation. The combination of low-code, no-code and AI-driven automation empowers developers and business stakeholders to work together more effectively, ensuring applications adapt as quickly as the imperatives of the business evolve.

OutSystems' low-code technology significantly simplifies the work of developers by using a combination of visual toolsets with AI-based guidance to simplify much of the needless complexity associated with new technologies, such as machine learning or progressive web apps (apps that use web technologies such as HTML and JavaScript). This is critical in a world where developer and IT resources are scarce and under ever-increasing pressure to innovate through software. In essence, modern application platforms using a low-code approach open up new avenues for developers to concentrate on innovating, and subsequently easily adapting unique software systems that are suited for delivering strategic, differentiated value to their businesses.

The next frontier of low-code will be a significantly increased use of AI/ML to ultimately achieve full lifecycle automation. OutSystems is pioneering this approach whereby software proactively assists and guides developers to build the right way, make the appropriate architectural decisions, avoid mistakes before accruing technical debt, and make big, complex systems self-healing and continuously adaptable. Full lifecycle automation will also enable rapid sharing of knowledge and empower developers to make smart re-factoring decisions.

The fast growing low-code/no-code market is expected to exceed $21 billion by 2022, and is forecasted to be responsible for over 65 percent of application development activity by 2024. Three-quarters of large enterprises are expected to be using no-code or low-code development tools for both IT development and citizen development activities by 2024.

Software as a Service (SaaS). SaaS takes this trend one step further by eliminating the need for application development and simplifying modern enterprise infrastructure by using the cloud to deliver applications, fully hosted, to the customer. In recent years traditional software vendors have been challenged—and even displaced—by cloud-first startups offering core enterprise applications (e.g., CRM; HR; ERP; financial reporting and planning; and governance, risk management, and compliance) as SaaS solutions. The hosted solutions provide lower cost of ownership, simplified adoption, global access, and scale that would be difficult, if not impossible, to deliver from the traditional data center. This has forced established vendors to play catch up and re-factor or develop their own solutions as a SaaS offering.

Another advantage of SaaS is the network effect it can create and support within a customer's ecosystem. When two parties are both users of a SaaS platform, that platform can enable interactions and automation between them. In many cases, this integration allows companies to access enhanced or advanced use

cases that they could not build on their own. All of this helps both the customer and the SaaS provider (which benefits from increased activity, and organic sales lead generation).

Overall, SaaS has made major inroads, reaching at least 20 percent penetration across all major industries, and over 35 percent in media and professional services. Spend on SaaS today is just over $100 billion, and is expected to grow at 16 percent a year to $141 billion by 2022. Much of this spend is coming from budgets that once supported legacy on-premises solutions, and the datacenter infrastructure to run them. Today, SaaS solutions existing across almost all industries and applications, creating an endless list of opportunities for commerce and investment. The vast majority of companies in the Goldman Growth portfolio deliver their services either exclusively or alternatively as SaaS offerings. Of particular interest, from an investment and market perspective, SaaS provides simplified delivery of software applications and enables more efficient sales models, with an ability to upsell and expand within the customer base. This provides a reliable and predictable recurring revenue model and enables companies to expand their markets by efficiently serving both large and small customers, and reducing geographic and organizational delivery complexities. The governance, risk and compliance (GRC) space, due to its multi-party nature and geographically spread workflows, benefits from the cloud-based delivery and network effect of SaaS.

EcoOnline is a fast-growing European provider of workplace health and safety SaaS solutions. This GS Growth portfolio company focuses on reducing the harm that chemicals can have on humans and the environment, enabling its customers to comply easily with complex regulations. The company's SaaS-based approach enables customers to leverage a vast database of up-to-date environmental, health, and safety data on chemicals, along with regulatory and technical data. The approach creates strong network effects among chemical producers, distributors, and consumers, who can share and access data on the platform. It further enables rapid deployment to customer sites, powerful data analytics, and a compelling mobile user experience.

One example of using SaaS to achieve improved go-to-market efficiencies is GS Growth portfolio company MetricStream, a solution for governance, risk management and compliance (GRC). MetricStream was originally developed as an on-premises product, but was re-designed to be a hosted, SaaS solution. Since its release in 2017, this hosted version has become the preferred way for customers to purchase the product. SaaS delivery simplifies the setup and operations of the platform, and also enables easy global deployment and interactions with third parties. Through hosting, implementation times have shrunk from months to weeks. MetricStream has also dramatically simplified its configuration and operations, allowing it to move down-market, enabling mid-sized enterprises to access a comprehensive risk platform that was previously practical only for the largest companies. Customers benefit further from more timely release of updates, new functionality, and rich, up-to-date content on the hosted platform.

2.3 The digitization of the enterprise

The cloud has not just changed the pace and scale of technology. It is redefining the business process and model themselves. Enterprises are adopting automation to increase employee productivity, using the cloud to create new, more direct channels to their customers and partners, and use social media to be more connected than ever.

The impact of RPA and AI on automation. Most enterprises strive to constantly enhance their customer experiences while simultaneously making their workforces more productive. Robotic process automation (RPA, which mimics human actions), artificial intelligence (which mimics human thinking) and low-code, are all part of the solution to these challenges. As enterprises seek to use automation to disrupt entire business processes, they will combine solutions like these to achieve what is called "hyper-automation."

According to McKinsey Global Institute, 51 percent of time in all US occupations is spent on collecting data, processing data, and predictable physical activities—all categories that have high potential for technical automation. About 60 percent of occupations have at least 30 percent of their activities that can be

automated by adapting currently demonstrated technology. Robotic process automation from companies such as Automation Anywhere (a GS Growth portfolio company) is expected to be one driver of this automation. With the Automation Anywhere platform, software users create software robots, or "bots," that can learn, mimic, and then execute rules-based business processes.

There will likely be more thoughtful and efficient usage of RPA as executives get more focused on improving operations and increasing cost efficiencies. The market for RPA software, which is currently estimated to be around $1.6 billion, continues to mature as vendors innovate to gain market share, making RPA more applicable to complex tasks that span across business functions (vs. involving only one business unit).

Companies can use RPA in tandem with AI to automate entire processes, achieving hyper-automation and accruing major benefits. According to estimates, by 2024, enterprises can lower their operational costs by 30 percent by combining hyper-automation technologies with redesigned operational processes. Furthermore, we expect that RPA scripts will become more dynamically generated instead of requiring a human to manually program an RPA bot, or using a process recorder to create a bot. A machine learning (ML) algorithm could generate RPA scripts from the data previously gathered by RPA bots from system logs, and from user interactions with applications and systems. This will create a flywheel effect as it lowers the barrier of adoption for RPA, enabling every user to leverage it to automate work processes, regardless of their technical expertise, and speeding up the time to deployment within enterprises.

Digitizing retail enterprises for an omni-channel world. Although the cloud is redefining most industry verticals, in recent times none have undergone as much change as has been seen with the digitization of retail. The internet has empowered consumers with a breadth of information and shopping alternatives that far exceed anything previously available. So it is no surprise that e-commerce penetration has gone from just 10 percent in 2017 to an estimated 16.1 percent in 2020. One important effect of this change is the decline in consumer brand loyalty, given the ease of exploring new products and the abundance of alternatives. In response, retailers have realized that they increasingly need to move their sales environment from predominantly a single offline channel to an omni-channel model, serving consumers wherever they want to shop.

Without this, retailers will invariably face lost revenue due to an inferior consumer experience. For example, an item bought online may be difficult to be returned in store, or an item browsed on a mobile device cannot be shipped to a local store. While physical retail is still the largest segment (accounting for close to 80 percent of all sales), other channels are increasing in importance. Users are increasingly open to making purchases in different channels: 35 percent are planning to use more shopping apps in the next 12 months, 32 percent are planning to use more social media, and 28 percent plan to increase purchases from messaging apps. COVID-19 has further accelerated the adoption of new mixed delivery models: in the US more than 40 percent of consumers are buying online with curbside pick-up, and 30 percent are buying online and picking up in store. Additionally, 30 percent of consumers have increased the number of their same-day or next-day deliveries.

In order to address issues like these, and deliver a seamless and unified experience for customers at every touchpoint, retailers are increasingly focused on digital transformation.

In response, various software solutions (primarily cloud-hosted ones in the form of SaaS) have emerged to address merchants' pain points across the lifecycle of an e-commerce order. SaaS can provide retailers with increased accessibility (for example access through different devices), higher consistency, reduced risk of outages, and easiness of update (for example in updating a website when expanding inventory). Some of the solutions currently available include, for example, those that provide replenishment, sourcing, and demand forecasting.

The first step for merchants in adopting omni-channel retail is often setting up web stores. Technology solutions lower the barriers to e-commerce by helping merchants launch and scale their online operations via integrated solutions for online storefront design, catalog management, hosting, and checkout. Merchants have a strong preference for easy-to-use software that allows sufficient customization of brand identity, while at the same time, provides a simple process in establishing the web store's back-end

infrastructure. One example that we have invested in is BigCommerce, a SaaS platform that simplifies the creation of online stores.

Through its platform and a large network of ecosystem partners, BigCommerce enables merchants to sell on web/mobile storefronts, blogs, websites, social media, and physical retail locations. Founded in 2009, BigCommerce initially targeted the small business segment with a simple, low-cost, all-in-one solution delivered through the cloud. Starting in 2015, it expanded to target medium and large merchants by offering a SaaS platform that combines enterprise-grade functionality, openness, and performance, with the simplicity and ease-of-use sought by small and medium businesses. BigCommerce provides a best-in-class, open, third-party partner ecosystem across payments, point-of-sale, shipping, marketing, and accounting. It is currently used by a number of multinational retailers including Avery Dennison, Ben & Jerry's, Sony, and SC Johnson.

Not only are brands investing in their own direct-to-consumer shopping capabilities via web stores, but they are also investing in growing their e-commerce volumes across an increasing number of online retailers (i.e., Amazon, Target, Walmart, Home Depot, etc.). This has created complexity for e-commerce teams to manage all of these various online channels that are becoming larger revenue drivers of their business – and an opportunity for technology providers to help brands measure and drive performance across multiple online retailers. Stackline is a GS Growth portfolio company that helps address this pain point through its platform that dramatically simplifies how brands manage their online channels and drive profitable e-commerce growth. By combining retail market intelligence, advertising automation, workflow management and operational analytics all into a single platform, Stackline is able to deliver a mission-critical operating system for e-commerce teams. The company's customers include global brands such as Sony, Levi's, Google, General Mills, and Starbucks.

To create a superior online shopping experience, and mimic a similar experience to that in physical stores, merchants are turning to new technology providers of creative sales solutions. Augmented reality (AR), for example, is expected to play a major role in lowering the uncertainty of online purchases by simulating the look, touch, and feel of merchandise remotely. Virtual simulations are expected to drive higher sales conversions and user engagements, while at the same time providing insightful data points for merchants to identify customer preferences and sales trends. Perfect Corp, the world's leading AR SaaS solution provider for beauty brands, is an example of a GS Growth investment in this vertical.

Founded in 2015, Perfect offers beauty brands and retailers subscription-based toolkits enabling them to offer a virtual try-on experience across multiple channels (e.g., mobile app, website, in-store kiosks, third-party ecommerce platforms) and product groups (e.g., makeup, skincare, and hair color). Perfect's offering is underpinned by an AI engine and proprietary deep learning algorithms built on data from billions of real-life try-ons around the world. Since the outbreak of COVID-19, AR try-on has become an even more important element of beauty product sales. New formats of AR try-on applications, such as scheduling virtual meetings with beauty advisors, and sales of beauty products via livestreaming are increasingly being adopted by beauty brands. Today, Perfect's customers include global beauty brands such as Estée Lauder, MAC, Dior, and Neutrogena.

With the online presence set up and with orders flowing in, inventory management and order fulfillment become the next most important area of focus for merchants. To get a holistic view of operational conditions, retailers require systems and infrastructures that are completely connected in order to manage product catalog, accept orders across multiple platforms, and reflect real-time availability of merchandises across channels. Adopting an omni-channel sales approach allows merchants to improve operational efficiency by placing inventories at locations close to where products are ordered or shipped from. Shanghai Jushuitan (Jushuitan), a portfolio company of GS Growth, is a leading solutions provider in this area in China. Jushuitan is connected to all major e-commerce platforms and China logistics providers, offering SaaS-based solutions for e-commerce merchants in the areas of order management, warehouse management, and intelligent inventory management. Despite the still low SaaS penetration among China enterprises, order management software is considered a must-have for medium and large merchants given the sheer amount of daily orders, and complex demand from

Chinese e-commerce consumers. As a result, Jushuitan is well-positioned to benefit from the strong fundamental growth in China e-commerce and digitization of Chinese enterprises. At the same time, there are immense opportunities for Jushuitan to upsell, taking advantage of its large user base and network effect to expand into other ancillary SaaS-based solutions such as supply chain management, de-stocking, business intelligence, and accounting management.

As e-commerce continues to disrupt the traditional retail scene, it also poses new challenges for the brands to operate in a fast-paced market. Our portfolio company Lequee, founded in 2015, provides 90-plus brand partners with one-stop digital and marketing solutions, as well as brand management services, allowing them to work with and operate on major e-commerce platforms.

On marketing and customer relationship management, we believe a new generation of membership management systems will continue getting traction as they offer retailers a depth of customer data that they can use to personalize brand messages and deliver a consistent welcoming experience to wow their customers.

Under the backdrop of an increasingly interconnected world, and with sales channels becoming increasingly diversified, the GS Growth team believes that retailers that fail to adopt an omni-channel approach will face material headwinds. As such, on the retailer side, we are most bullish on companies that have well-thought-out, multi-channel sales strategies with established infrastructure to support them, along with the companies that are supporting them in their digitization journey.

The changes retail has experienced from the cloud might be seen as a canary in the coalmine for the kind of impact that will eventually be seen across most industries, whether it be directly or indirectly, through new platforms such as social media.

Connecting with the customer. Traditional sales processes are being reinvented as they leverage the power of the cloud. One example is portfolio company ON24, which provides a leading cloud-based digital experience platform that enables B2B companies to run interactive webinar experiences, virtual event experiences, and multimedia content experiences. The company enables enterprises to evolve from traditional marketing approaches, such as "cold-calling," "snail mail," industry networking events, and in-office visits, to more scalable, cloud-based approaches. According to Gartner, by 2025, 80 percent of B2B sales interactions between suppliers and buyers are expected to occur in digital channels. ON24 enables this transition and helps companies achieve deep levels of personalized engagement and interactivity.

Managing social media's impact. One of the more powerful tools that has emerged in the cloud is social media. Social media has amplified the voice of the customer and transformed it from useful feedback to being a driving force of commerce. Whether an enterprise digitizes or not, it cannot ignore the impact of managing its reputation and relationship as defined in the various social media channels. Our portfolio company Sprout Social empowers businesses around the globe to tap into the power and opportunity presented by the shift to digital social communication. Virtually every aspect of business has been affected by social media, from marketing, sales, and public relations to customer service, product and strategy – creating a need for an entirely new category of software. Sprout Social offers its more-than 25,000 customers a centralized, secure, and powerful platform to manage this broad, complex channel effectively across their organizations.

2.4 Protecting the enterprise from evolving cyber threats

As industries digitize, cybersecurity is becoming a topic of the highest importance. Companies of all types and sizes need increased protection for the data they generate and use, as well as for their operations, which are increasingly connected and at risk.

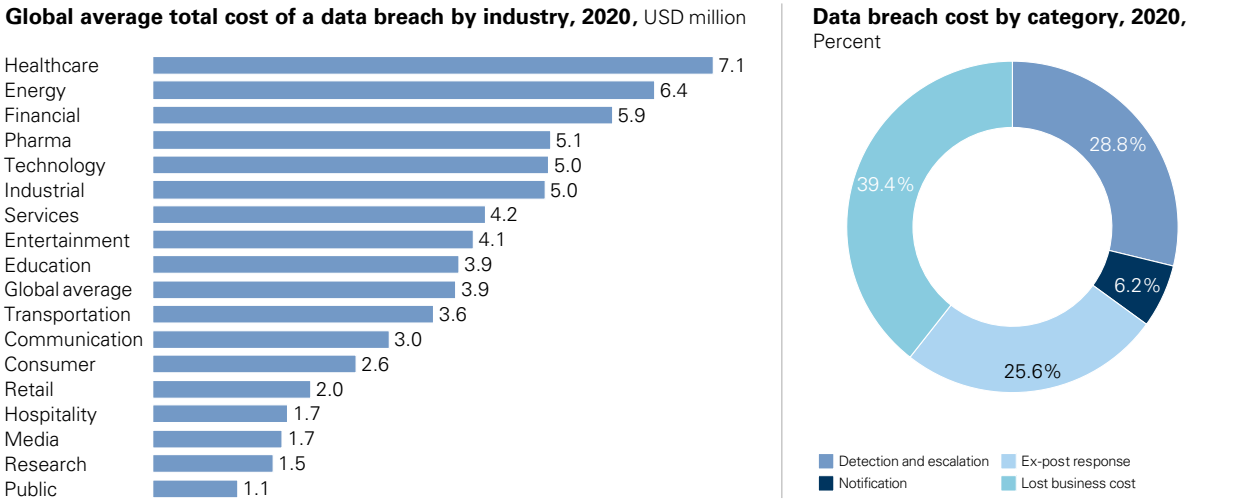
COVID-19 has further increased the need for cybersecurity. With many employees working from home, there are multiple new vectors for cyberattacks and data leaks, requiring companies to address new issues such as home network security and compliance. Beyond this, cyber-attacks, both internally and externally, are rising to the point where 94 percent of security professionals have increased concerns about

ransomware, phishing, social engineering attacks, and other threats, and close to 40 percent of companies have suffered a cyber event within the past year.

Cybersecurity breaches can cause significant financial damage to the enterprises being attacked – costs that can run to several million dollars, including loss of business, ex-post response costs, detection and escalation, and notification of the breach (Exhibit 6). All of this has spurred rapid growth in the global information security market, which is expected to reach $125 billion in 2020, and $175 billion in 2024.

Exhibit 6

Cyber incidents can have a significant financial impact for affected companies



Source: IBM, Cost of a data breach report, 2020

Responding to new regulations. In addition to the ever-increasing risk of cyber threats, the proliferation of new government cybersecurity regulations across geographies and verticals is driving market growth.

Many new regulations, such as GDPR[8] in Europe and CCPA[9] in California, focus on the protection of sensitive data or personally identifiable information. Achieving and maintaining compliance is costly and time-consuming for companies of all sizes. Sensitive data has become a primary target of cyber criminals, who can sell or exploit stolen data.

Innovative solutions are emerging that protect companies by protecting their data assets directly. Very Good Security (VGS), a GS Growth portfolio company, provides a no-code data security platform-as-a-service (PaaS) for mid-market and enterprise customers. This platform collects, protects, and exchanges sensitive data. It addresses a broad range of data security and compliance use cases (primarily for fintechs), and operates at the intersection of many multi-billion dollar markets. VGS fundamentally rethinks how businesses secure systems by removing sensitive data from them, and securing it, and all the data processes behind it. This inherently makes both existing and new applications more secure, easier to build and maintain. Once a customer is sending data through the VGS platform, it can simply layer in additional compliance or security. VGS solves this problem with a solution that is affordable enough for mid-market companies and

[8] European Union General Data Protection Regulation
[9] California Consumer Privacy Act

powerful enough for major enterprises, with use cases including GDPR, PCI[10], and SOC 2[11]. Its power and simplicity has allowed it to quickly grow a large and diverse customer base including Texas Capital Bank, Doordash, Sallie Mae, GE Transportation, and Brex, a manager of corporate financial functions.

Inside the datacenter, GS Growth portfolio company Acronis provides solutions that natively integrate cybersecurity, data protection and management to protect endpoints, systems and data. Traditional antivirus and backup solutions frequently lack integration and require significant time for management. In addition, a patchwork of (even best of breed) system and endpoint protection tools can create gaps in defenses. For example, many traditional antimalware solutions are not-integrated with backup, and are thus unable to recover data and lack the ability to detect threats in a secondary backup copy of data. Acronis provides a unified approach, consisting of a single agent, single management console, single backend infrastructure, and single license. This integrated solution helps businesses of all sizes streamline operations by automating the detection, prevention, and recovery of data.

Fully outsourcing the security infrastructure. Traditional approaches to data security involve building out a secure and compliant technology stack. These are very expensive, difficult to build and maintain, require significant internal expertise and time, and still leave systems vulnerable to insider attacks. They are also hindered by growing staffing and skill shortages, an ever-increasing threat landscape, and the new compliance burdens.

These challenges are leading companies of all sizes to offload their security needs to new technologies and specialist providers, including managed security service providers (MSSPs). These provide outsourced monitoring and management of security devices and systems, using high-availability security operation centers designed to reduce the number of operational security personnel. Managed cybersecurity services is the largest category in the overall information security market, accounting over 20 percent of total firm spending, totaling over $27 billion in 2019 and expected to more than double by 2025 to $65 billion.

For small and medium businesses (SMBs), adoption of managed security services is driven by the cost effectiveness of gaining access to specialized security tools and expertise on a shared basis. Many organizations do not have the budget to hire a team of full-time advanced intrusion analysts who might investigate just a few incidents per week. An MSSP can amortize the cost of this advanced experience over multiple enterprise customers. Essentially, SMBs find themselves gaining time-shared access to the tools, techniques, and knowledge of a wide array of specialized security professionals for the cost they would otherwise incur hiring a smaller team of full-time security generalists.

For larger enterprises, MSSPs frequently complement dedicated internal security operations teams, offering additional capacity and expertise, as well as a second set of eyes to review alerts in their network.

Deepwatch is an MSSP in which GS Growth has invested. Deepwatch provides monitoring and management of security devices and systems, using high-availability security operation centers designed to reduce the number of operational security personnel that an enterprise needs to hire, train, and retain to maintain its security posture.

The company uses only third-party products, and does not compete with cybersecurity vendors through its own proprietary products. This provides focus and clarity of message for customers, software vendors, and channel partners. Deepwatch supports only best-of-breed security products, such as Splunk, Checkpoint, and Palo Alto Networks. Deepwatch also offers a broader range of high-end services than most MSSPs, including security information and event management, vulnerability management, endpoint, and firewall management. This provides flexibility for its enterprise clients to own, manage, and support their software licenses directly if they prefer.

The company has grown a large and diverse customer base including Spectrum Health, Staples, Cinemark, BCG, Wawa, and Apple Bank.

[10] Payment card industry
[11] The second of three system and organization controls audits and reports

3 | Consumer

3.0 Overview of consumer space

The consumer sector—with its many innovators, trend setters, and new market leaders—is being shaped by massive shifts in both supply and demand. The supply shift, driven by technological advancements, has been most pronounced in the past decade. This has, in turn shifted demand, driven by rapid adoption of new technology by younger generations, and increasing acceptance of new entrants by older generations. Indeed, the world is now settling into a new equilibrium in the market for consumer goods and services.

On the supply side, infrastructure and technology have matured to allow for competitively priced online purchasing, and fast delivery of digital content and services. E-commerce-centric business models can now be competitively priced with incumbents, and digital content and service providers can stand behind a fast and reliable value proposition. Bolstering these trends is the proliferation of social media, which provides low-cost and targeted customer acquisition platforms with viral capability. As a result, players have numerous, attractive entry points into the consumer landscape.

On the demand side, the world has seen a major demographic shift in the past decade, as Generation Z became the largest, constituting 32 percent of the global population, followed by Millennials, who overtook the Baby Boomers in 2019. These cohorts of consumers are digitally inclined, and are advocates of change. They are eager to adopt new business models, and have triggered widespread disruption of incumbent market leaders across many different categories.

GS Growth expects the manifestations of these fundamental shifts in demand and supply to play out further over the next decade. We see four manifestations, or developing themes, that will emerge, and we intend to look to these as the basis for future investments: 1) the reallocation of how consumers spend their leisure time; 2) the unbundling of broad online communities into more vertically focused platforms; 3) the rise of mission-driven brands and sustainable business models; and 4) the growing adoption of digital consumer services. We are also looking at companies that are supporting these trends through infrastructure technology and logistics solutions.

3.1 Reallocation of leisure time

We believe the shifts in supply and demand for consumer goods and services will significantly impact the ways consumers spend their leisure hours. In the US and Europe, the average consumer has 5 hours of leisure time per day, while in China this number is just below 4. This represents billions of hours per day, and is a massive opportunity in all geographies.

A quick look back into history reveals that the way consumers allocate their leisure time is fairly stable up until a technological change incites a fundamental shift. The introduction of radio took time away from newspapers, magazines, and books. Later, TV took time away from radio and reading.

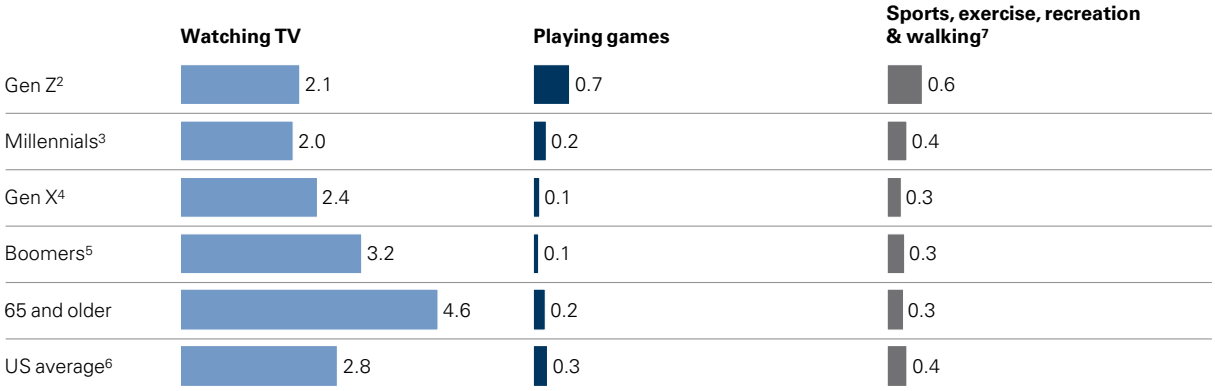
Today the innovations are multiple and moving rapidly. Smartphones and broadband have ignited a shift away from linear cable TV, to streaming content categories (e.g., short-form video, long-form video, live streams, games) on a multitude of device types (e.g., TV sets, iPads, iPhones). There are 3.6 billion smartphone users globally (56 percent of whom are in Asia Pacific), and global smartphone penetration is 48 percent. There are more than 4 billion global internet users (54 percent penetration), and connection speeds are rapidly improving. For instance, 5G is projected to grow from less than 3 percent of total connections in 2020 to over 20 percent in 2023 (with over 55 percent penetration in the US).

These trends are disrupting linear TV, with consumers demanding new venues for their leisure hours. In 2019, Americans spent an average of 2.8 hours per day watching TV – about 60 percent of total leisure time. That sounds large, but it is important to note that much of this is older adults. Younger generations are reallocating time away from TV to other leisure activities. Even within TV, younger cohorts are moving away from traditional TV to streaming a wide range of content on a wide range of device types, creating market opportunities for new classes of content creators and digital media. We see this reshuffling happening globally. In particular, younger cohorts across geographies are reallocating time to digital and social media, gaming, and fitness (Exhibits 7, 8).

Exhibit 7

Younger generations spend less time watching TV, and are shifting towards other leisure activities including gaming and fitness

Average daily hours spent in select leisure activities by demographic[1], 2019, hours



1. Demographic groupings have been aligned to match available BLS data
2. Gen Z defined as 15–24 years (vs. 8–23 years)
3. Millennials defined as 25–44 years (vs. 23–38 years); Output determined by average of time spent for 24–34 and 34–44 age groups in 2019 for each category
4. Gen X defined as 45–54 years (vs. 39–54 years)
5. Demographic groupings have been aligned to match available BLS data
6. Gen Z defined as 15–24 years (vs. 8–23 years)
7. Millennials defined as 25–44 years (vs. 23–38 years); Output determined by average of time spent for 24–34 and 34–44 age groups in 2019 for each category
8. Gen X defined as 45–54 years (vs. 39–54 years);

Source: US Bureau of Labor Statistics; American Time Use Survey

Exhibit 8

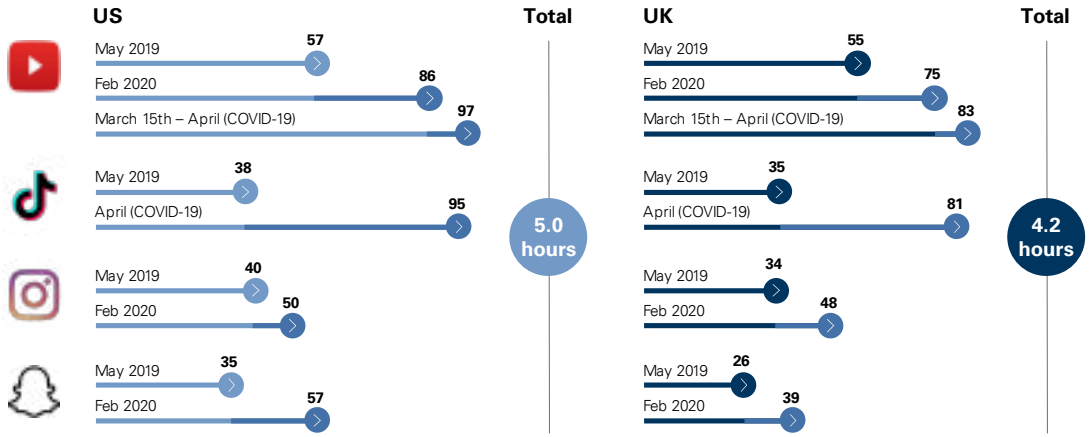
Examples of the shift away from linear TV

Digital and social media. The growth trends in digital media are particularly pronounced. Exhibit 9 covers US and UK kids. In China, it is similarly popular, with TikTok and Kuaishou (video), WeChat and QQ (messaging), and Sina Weibo (blogging), all having attracted around 130 million users below 24 years old. Across age groups, Chinese users spend 80 minutes a day on TikTok and WeChat, and 113 on Kuaishou.

Exhibit 9

US and UK kids spend over 4 hours a day on social media, a number that has increased since the pandemic started

Average minutes per day spent on social platforms, Minutes



Source: Qustodio, Connected More than Ever: Apps and digital natives: the new normal, May 2020

GS Growth invested in Lightricks as a way to get exposure to the rising time spent on social media. Lightricks provides a suite of mobile photo and video editing apps for consumers who want to "facetune," or edit and retouch, their pictures and videos.

Also within digital media, we invested in Innovid, an omni-channel advertising platform highly levered to connected TV through its partnership with Roku. Additionally, we invested in Moonbug, a kid's digital media business that produces short-form animated content, and distributes it on YouTube and streaming services such as Netflix and Amazon.

Fitness. As younger generations consume more via digital platforms, and healthy and mindful living grows in importance, connected fitness is expected to experience growth of 4 percent-to-5 percent per year globally. With the closing or limiting of many gyms due to COVID-19, this trend is accelerating. For example, Peloton connected fitness subscriptions nearly doubled from 500,000 at the end of 2019 to more than 1 million in Q4 2020, and workouts completed increased by more than 200 percent year-over-year to 165 million.

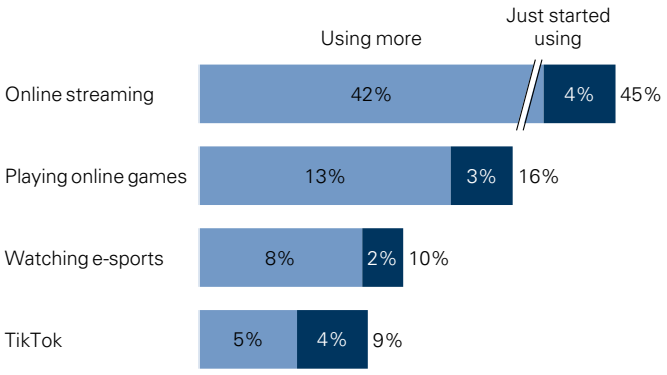
We invested in Keep to get exposure to the rise of digital fitness. Keep was founded in 2014 and is, by far, the most popular fitness app in China, serving over 200 million registered users through product offerings including training videos, fitness gear, intelligent exercise equipment and more.

Gaming. Gaming represents another significant draw away from TV. China and US are the largest markets, both accounting for close to 25 percent of the total, which crossed $150 billion globally in 2019. Gaming is popular across generations and demographics, with 50 percent of players below 30 (Exhibit 10). Importantly, this group is expected to continue to allocate time to gaming as they age up.

Exhibit 10

The transition to online entertainment, including gaming, has accelerated with the intensification of the pandemic

Have you used or done any of the following since COVID-19 started[1], % of respondents



43 million daily hours watched on Twitch in March 2020, vs. less than 30 million at most in January

150 million monthly active users in July 2020, up from 115 million in February[2]

~250% growth in Nintendo's net profit year on year on the first 6 months of 2020

1. Q: Have you used or done any of the following since the coronavirus or COVID-19 situation started? If yes, Q: Which best describes when you have done or used each of these items? ("Just started using since COVID-19 started"; "using more since COVID-19 started"; "using about the same since COVID-19 started"; "using less since COVID-19 started.")
2. As of April 8th 2020, compared to subscribers in January 2020; 4. As of April 22nd 2020, compared to subscribers in January 2020

Source: McKinsey & Company COVID-19 US Consumer Pulse Survey 4/6–4/12/2020; n=1,063, sampled and weighted to match US general population 18+ years

3.2 Unbundling of broad online communities into vertically focused platforms

Social interaction and interpersonal connection have been core to consumer behavior since the beginning of time. However, advances in technology have led to new entrants that have vastly broadened the term "community." Without the need for physical venues or physical attendance to be "together," communities have become both instantaneous and limitless. Facebook, YouTube, and Amazon are all examples of platforms that emerged to serve an infinite number of communities that can operate anytime, anywhere, and at an infinite capacity.

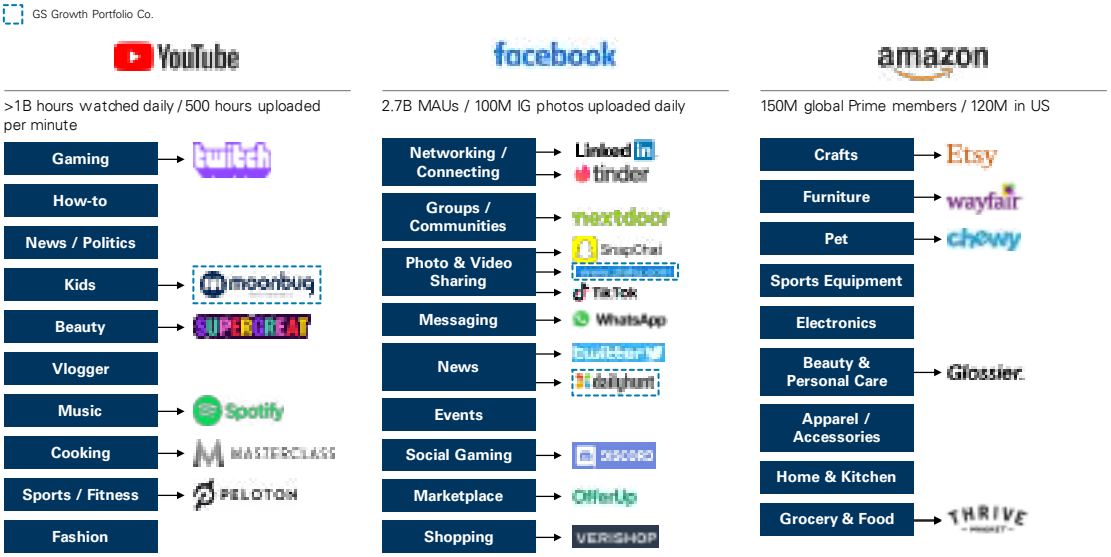
The introduction of these platforms married perfectly with the demands of the demographic shift of younger consumers seeking virtual interaction, resulting in viral adoption and massive scale.

As we look forward, we expect the sheer abundance of content and consumers on these platforms will create an opportunity for niche, vertically-focused companies to pull out specific topics, and live as concentrated, credible communities outside the major ecosystems.

As shown in Exhibit 11, the shift towards vertically-focused communities is already underway, spurred by consumer desires for access to niche information and credible insights. Twitch built a community around live-streaming of video games, where the most popular games, such as League of Legends and Fortnite, have totaled more than 1 billion hours watched in 2019/20. Nextdoor launched neighborhood communities for people to exchange information, goods, and services, and is currently used by 1 in 4 US households. We expect narrow communities such as these to continue to gain popularity, and grow quickly due to their ability to gain trust, as a focused offering with highly engaged and emphatic community members.

Exhibit 11

Niche vertical players can attract audiences from massive platforms



We have already begun investing in this theme through our stake in DailyHunt, an Indian content and news aggregator app, providing local language content in 15 languages from 11,800 publishers. Additionally, we invested in Zhihu, the leading online community for quality content sharing in China, and the go-to source for those looking for in-depth knowledge, experience, and insights on a wide variety of topics and current events. With more than 57 million monthly active users, Zhihu is one of the most active online communities in China, with strong user stickiness. The animation company Moonbug, mentioned earlier, also fits into this theme, pulling kids away from YouTube.

3.3 The rise of mission-driven brands and sustainable business models

The long-term impact of the supply and demand shifts in the consumer market is also manifesting itself in the rising importance of brand messaging. Lower barriers to entry and the ability to target micro-demographics using digital marketing campaigns have resulted in a major influx of supply. Thousands of brands have taken advantage of the opportunity to launch with a targeted group of consumers, and prove product-market fit with engaged first adopters before moving more mainstream.

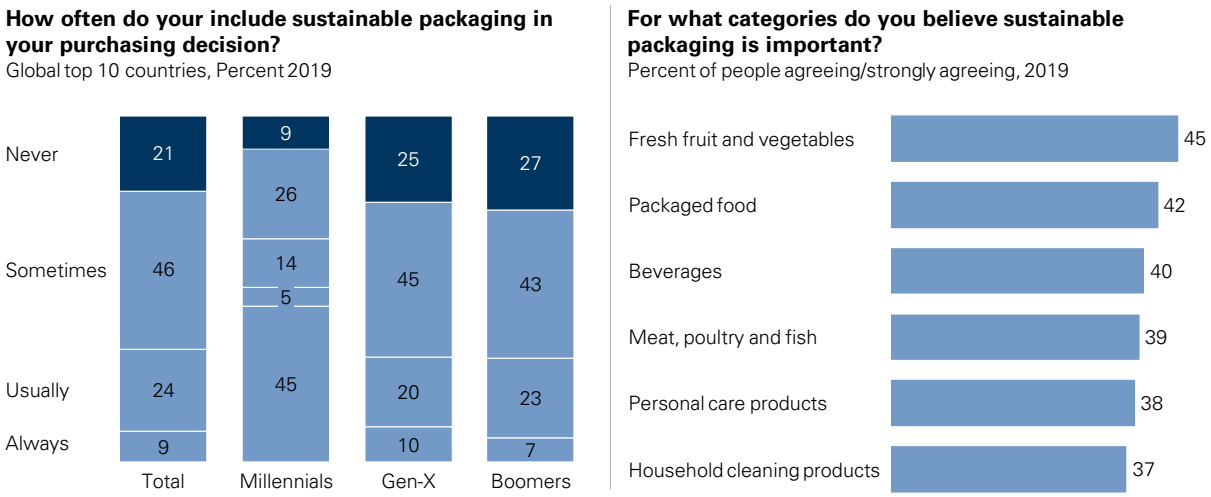
Many of these brands have experienced significant growth, as they took advantage of a robust shift in consumer demand. Younger cohorts want to support brands that are rooted in an ethos that they identify with. Now more than ever, consumers are highly sensitive to the fact that the brands they purchase (e.g., the clothes they wear, the food they eat) tell a story to the world about their own values and what they stand for. As a result, companies have been highly successful in disrupting legacy product categories by expressing a more modern brand ethos.

We believe brands that are rooted in a genuine social purpose, or that anchor their products to sustainability, are well-positioned to benefit from growing consumer demand for products that represent shared values. We will seek exposure to businesses focused on sustainability, targeting social issues, or those driven by a desire to provide accessibility. These topics are already top-of-mind for consumers (Exhibit 12). For

instance, they have translated into growth in sales for consumer products with sustainability claims – with a 4.5 percent CAGR from 2013-to-2018) vs. 0.8 percent for products without such claims.

Exhibit 12

Sustainable packaging choices influence purchasing decisions, especially for Millennials



Source: McKinsey 2020 Global Sentiment Survey

GS Growth invested in Billie, a mission-driven women's shaving and personal care brand that was launched with a strong ethos for female empowerment. Additionally, we invested in Kate Farms, which offers plant-based medical-nutritional formulas to patients living with a wide range of diseases, conditions, and circumstances. The company uses only organic and sustainable ingredients, which are easier to digest and better for the planet. We also invested in Sapphire Foods, one of the largest franchisees of Yum! Brands Inc. in the Indian subcontinent, with a track record of successfully operating more than 400 KFC, Pizza Hut and Taco Bell restaurants across India, Sri Lanka and the Maldives. Finally, we invested in Burst, an oral care brand that delivers a high-quality electric toothbrush at a fraction of the price of comparable incumbent products.

3.4 Digitization of consumer services

The convenience of digital services—their strongest value proposition—has long been known. However, now that younger generations have aged up, and technology allows for fast and reliable delivery of those services, we expect their continued penetration globally over the next decade. Businesses such as Uber, Airbnb, and Task Rabbit were important to solidify the social norm of consuming services via a digital platform. Now technology has improved trust in the reliability and quality of digital services; recall that it was only a few years ago that the delivery time for a Seamless order was rarely accurate (or it would never come at all).

We see two high-potential categories of digital service providers: 1) digital booking or engagement platforms that lead to a physical deployment of the service; and 2) a complete digital experience that requires no in-person interaction to deliver the goods or service. These providers have already been

successful across many different categories including travel, food delivery, real estate, mobility, fitness, repairs, healthcare and education.

To gain exposure to travel, we invested in Klook, a leading digital travel destination products and services company in Asia. In auto maintenance and repairs, we invested in Tuhu, a leading digital auto aftermarket retailer and service provider in China, which markets a wide range of aftermarket products to consumers, and provides the offline services through a nationwide franchise store network. We also invested in Carzone, a leading player in the highly fragmented auto parts distribution market in China with a more 2B focused business model. In education, we invested in Zuoyebang, China's largest K-12 online education company, which allows students to get answers to questions, and also offers online live tutoring. We also invested in iTutorGroup, a leading online on-demand interactive learning platform in China that provides online tutoring services (English, math and coding) for adults and children. In beauty, we invested in Purplle, India's 2nd largest beauty and personal care focused online retailer, which uses search traffic and data analytics to identify underserved segments, and deploys a recommendation engine and augmented reality for a virtual shopping experience. In real estate, we invested in Zigbang, Korea's largest online/mobile real estate information platform, which enables users to browse and discover residential real estate properties and connect with real estate agents. In home design, we invested in Livspace, India's largest omni-channel full service home interior design solutions provider. Livspace uses a technology platform to bring home owners, interior designers, furnishing vendors and servicing contractors to create price transparency, standardization and delivery promise in a highly fragmented market. In smart home, we invested in Bitkey, Japan's leading digital key platformer which provides smart locks that turn physical locks into smartphone enabled digital locks. Bitkey also provides digital key exchange platform in which users can generate and transfer digital keys with other users and various home service providers. In eyewear, we invested in Mister Spex, the leading omnichannel optician in Europe. Finally, in grocery and food delivery we invested in EU-based Wolt, Korea-based Woowa, (both in food delivery) and Rebel Foods, an India-based cloud kitchen.

To date, we have deployed most of our capital in digital consumer services in Asia-focused markets. We believe geographies with wider income gaps and low minimum wages have the most attractive long-term margins for services businesses that require person-to-person delivery. However, going forward, we will also look for opportunities in the US and EU. We believe these markets are earlier in their adoption of digital consumer services. Secular trends are also very attractive in these geographies.

3.5 Enabling e-commerce acceleration through infrastructure technology and logistics

We recognize that the digitization of the consumer industry would not be possible at scale without the infrastructure technology and logistics solutions enabling it. Digital and smart logistics and automated warehousing and robotics have been, and will continue to be, important foundations for the continued penetration of e-commerce. Specifically, e-commerce businesses are highly focused on these services: 1) data-driven infrastructure optimization, such as inventory management and packaging solution innovation; 2) warehouse optimization to improve fulfillment speed; 3) automation to help process orders, such as driverless delivery vehicles, and automated guided vehicles (which navigate via implanted wires, radio, cameras, or lasers); and 4) worldwide networks to accelerate the development of cross-border e-commerce.

To get exposure to this important area, we invested in Korea Superfreeze, one of the largest cold-chain logistics centers in the country. Korea Superfreeze uses environmentally friendly and energy efficient liquefied natural gas technology for its frozen goods warehouse, the first of its kind in Korea. Additionally, we invested in Qingdao Gooday Logistics, the largest logistics solution provider in China for large-format goods, including home appliances, furniture and fitness equipment.

4 | Healthcare

4.0 Overview of the healthcare space

Disruptive technologies, changing demographics, a dynamic regulatory environment, and shifting consumer preferences are reshaping healthcare across the world. The COVID-19 pandemic is accelerating these changes several ways. Many more patients are using new technologies to access and manage their own care. There are also fundamental shifts in patient journeys, and new remote working models. Finally, healthcare ecosystems are being completely reimagined through digitization. For instance, 46 percent of consumers now report using telehealth to replace in-person doctor's appointments, up from 11 percent last year. Asked about their satisfaction with telehealth, 74 percent of respondents say yes, and 75 percent said they would use it in the future. Moreover, many more patients are accessing their medical records via apps, and monitoring their health using via wearables. Additionally, 35 percent more consumers are now purchasing OTC drugs online.

Faced with cost pressures, healthcare organizations are using technology to shift to delivery modes that focus on achieving better outcomes for patients. For instance, using artificial intelligence, hospitals are improving the equipment and allocation of doctors for surgeries, using analytics to reduce cost of services, and engaging with patients across the care continuum to improve care delivery and outcomes. Emergence of interoperability of data is allowing different providers to serve the same patient effectively.

Innovative healthcare companies are helping accelerate these trends and creating significant value for investors along the way. Five main themes emerge: 1) accelerating the consumerization of healthcare, and the shift to value-based care; 2) developing innovative delivery methods, such as virtual health; 3) using data to improve the efficiency and quality of care; 4) accelerating the growth of R&D outsourcing outside of traditional markets; and, 5) closing the therapeutic gap between developed and emerging markets.

4.1 Accelerating the consumerization of healthcare, and the shift to value-based care

Historically, the healthcare system placed little focus on the preferences of patients, and patients rarely asserted their own interests. Some of this is simply due to the nature of medicine. Healthcare does not lend itself to the kinds of decision making that consumers do in other areas of their lives. Elsewhere, they can make purchase decisions based on their unique preferences and values – whether those be related to cost, quality, convenience, or brand. Decision making in healthcare has never been that clear and the concept of "shopping" for healthcare has only recently started to emerge.

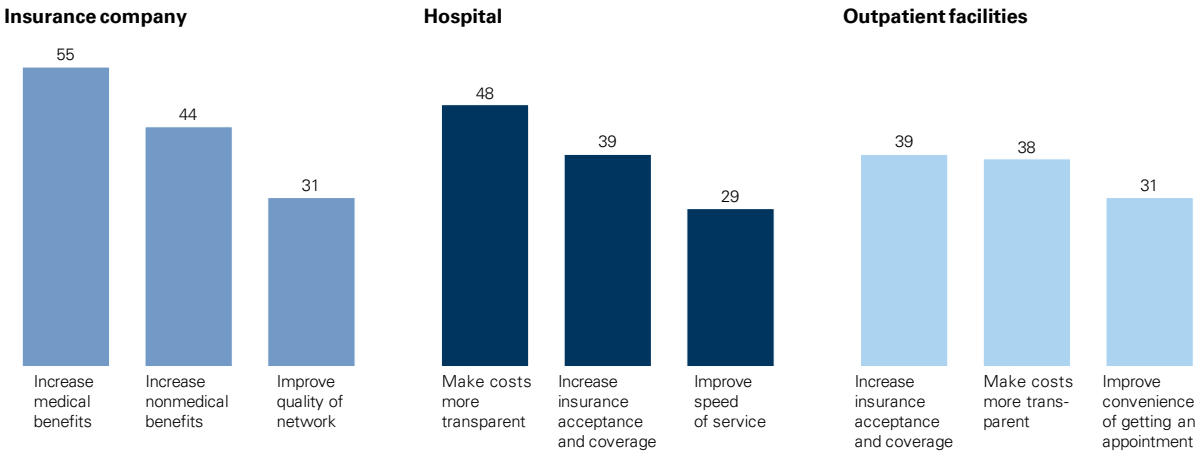
While this is a global trend, in the US it has been compounded by the complexity of the system, and the competing interests of doctors, hospitals, and insurers. The payment and reimbursement process has been largely opaque, and consumers have had few tools to navigate it.

Ultimately, stakeholders in the healthcare value chain have failed to prioritize customer experience and have not listened to their needs. Consumer surveys highlight their desire for things like broader insurance coverage, improving the quality of provider networks, and making costs more transparent (Exhibit 13).

Exhibit 13

There are a number of initiatives healthcare providers could adopt to better serve patients' needs

Initiatives of healthcare companies to better meet needs of patients,
Percentage of respondents (multiple-choice question)[1]



1. Answer to question, "What should a healthcare company do to better meet your needs?"

Source: McKinsey Consumer Health Insights Survey 2018, N=4,911, respondents based in the US

A major catalyst in changing this longstanding status quo in the US has been the introduction of value-based care—paying for care based on positive health outcomes rather than on the volume of services delivered. This change has ushered in a new incentive system, bringing the patient experience into greater focus by linking it to provider reimbursement.

Another factor is the rise of consumer-driven health plans (CDHPs), including health savings accounts (HSAs), which are set up by employers to shift more of the cost for paying for care to their employees. These plans require employees to set up HSAs and other accounts to pay for routine care, and have high deductibles, leaving insurers to pay only for higher-cost treatments. From 2008 to 2018, high-deductible plans grew from 25 million to over 60 million, and their share within total insured members increased from 12 percent to 26 percent. Charged with more financial responsibility for their own care, patients are expecting more from an industry that previously overlooked their preferences.

These changes have created a massive opportunity for innovators and disruptors to reshape an industry that accounts for nearly $1 out of every $5 spent in the US. Behind "the consumerization of healthcare," there are companies determined to re-imagine the patient experience across every step of their journey, be it in the US or globally. Direct-to-consumer health and wellness companies are improving access to modern treatments, and next-gen insurance and primary care platforms are challenging the hegemony of the largest incumbents.

GS Growth is betting that the key to unlocking better health outcomes is to prioritize the consumer, and we are actively looking to invest in companies that do just that, across geographies.

Examples of companies that are accelerating the consumerization of healthcare and adoption of value-based care include One Medical and Oak Street Health. Among our investments, we have several companies that are examples of this trend across different geographies. DrFirst, a leading US-based provider of software that enables providers to write e-prescriptions, has also developed applications

to improve patient medication adherence, and to provide patients with greater medication price transparency. In China, WeDoc is a leading healthcare technology platform that provides online appointment booking for offline healthcare services, facilitates online consultation for patients, and also connects public hospitals with pharmacies. The company currently connects 7,200 partner hospitals and 27,000 pharmacies with 227 million registered users, enabling an average of 40,000 online consultations and 30,000 prescriptions every day. Union Medical Healthcare is the largest medical aesthetic services provider in Hong Kong and has leveraged on its strong customer base to expand into other medical disciplines, including health screening, vaccination and diagnostic imaging, to become a one-stop shop for consumer healthcare management. Another example is Docplanner, which is a leading online appointment booking platform in Europe and Latin America for more than 65,000 doctors and clinic subscribers. Docplanner has expanded its services to allow patients to book both in-person and virtual doctor consultations through its platform.

4.2 Developing innovative delivery methods, including virtual health

Around the world, healthcare services have been leaving traditional sites of care such as doctors' offices and medical clinics and moving to alternative sites such as worksites and virtual care. These alternative modes are also outgrowths of the rise in patient involvement in their own care, and the fact that they are paying for more for that care. Naturally, they are seeking more affordable and convenient ways get and stay healthy.

COVID-19 has only accelerated the trend, particularly telemedicine, and the change will probably be permanent. Around 75 percent of US consumers are likely to use telemedicine this year, both for pandemic concerns and unrelated health issues, up from 11 percent in 2019.

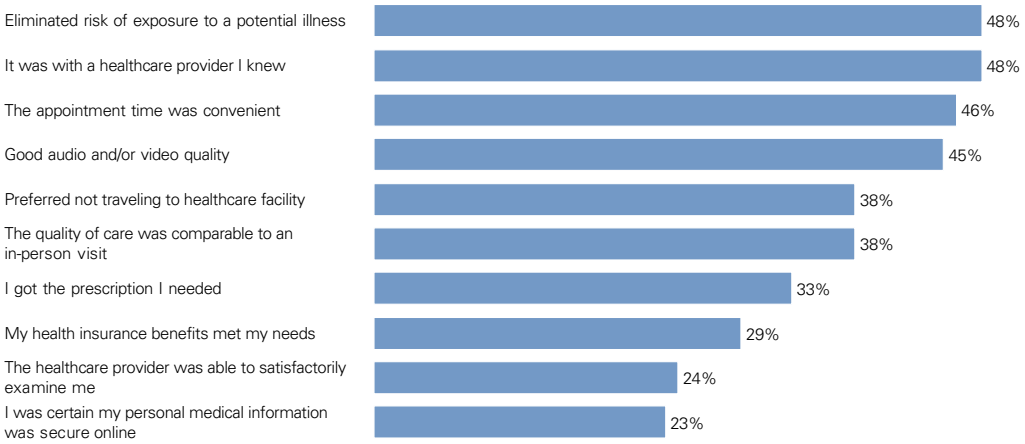
Technological developments are also accelerating growth of alternative care settings. For example, improvements in sensors and wearable devices have made remote patient monitoring more affordable and effective. These patients send useful information to providers, and enable additional healthcare services to be delivered safely in a home setting.

Likewise, caregivers are looking for ways to bring down their costs, and alternative sites and modes of care allow a reduction of overhead. In addition, they are often more convenient, prompting patients to engage earlier and more frequently in the healthcare system, and ultimately supporting better outcomes. This trend has also been accelerated by COVID-19, as benefits of alternative sites of care, in particular telemedicine, are even more apparent (Exhibit 14).

Exhibit 14

Benefits offered to patients by virtual care are even more evident post-COVID-19

Top 10 reasons reported for being very satisfied with telemedicine visits,
Percentage of respondents[1]



1. Response to question, "What, if anything, made you satisfied with your telemedicine or telephone appointment?"
2. N=248

Source: McKinsey Global COVID-19 consumer survey, 6/8/2020, 7/14/2020

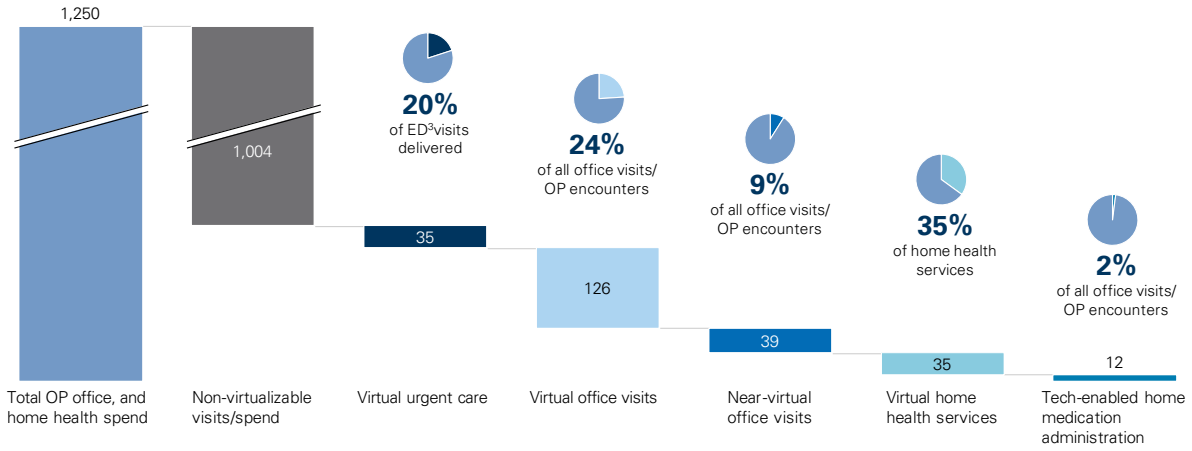
In addition, companies are using AI to automate certain operations in healthcare settings. For instance automation can reduce hours that medical workers need to prepare equipment by 50 percent. Likewise, it can reduce hours for medical assistants by 32 percent.

The GS Growth team expects that all these developments will continue to improve clinical outcomes, reduce costs, and drive growth of alternative care settings and modalities. For instance, we estimate that around 20 percent of all outpatient healthcare spending (about $250 billion) could be delivered virtually (Exhibit 15).

Exhibit 15

20% of outpatient healthcare spend in the US could be made virtual, up to $250 billion

OP[1] and office visits that can be virtually enabled in the US,
Commercial, Medicare, and Medicare 2020 estimated[2], USD Billion



1. Outpatient
2. Projected from 2018 commercial and Medicare spend, using National Health Expenditures
3. Emergency department

Source: Anonymized claims data representative of commercial, Medicare and Medicaid utilization

Publicly-traded companies that are examples of virtual care providers or enablers include Teladoc, Amwell and Accolade. Among our investments this area is 98point6, which provides text-based, on-demand, digital primary care. 98point6's team of board-certified physicians use artificial intelligence (AI) and machine learning (ML) to reduce friction between physicians and patients, allowing more effective care delivery and a superior patient experience. 98point6's accessible and affordable virtual clinic has seen significant adoption, which accelerated during the Covid-19 pandemic, with over 240 commercial partnerships and 3 million members.

As for alternative site providers, we previously invested in a worksite health company that provides direct primary care services to employees of medium and large self-insured employers in over 40 US states. This company manages medical clinics at or near the employer's place of work, staffed by physicians and other providers, and also uses virtual health tools, including telemedicine and health coaching services. Services also include behavioral health counseling, physical therapy, occupational health, and an onsite pharmacy. This worksite health company is able to drive meaningful reductions in medical expenses as it engages employees, improves use of preventative healthcare services, and reduces use of more costly services such as emergency rooms and hospitalizations.

4.3 Utilizing data to improve efficiency and quality of care

In the past decade, many healthcare providers have made foundational investments in technology to improve the efficiency and quality of care. Analytics are enabling coordinated and personalized, evidence-based care that improves delivery and patient outcomes, and helps identify and engage under-served and at-risk populations. New technologies such as block chain are enabling integration of electronic health records (EHRs), and enabling access to 360-degree views of all patient records.

For example, spurred by the Affordable Care Act, many systems and providers adopted electronic medical records (EMRs) and practice management software. These investments have laid the groundwork for new technological advances to drive efficiency and value further. For instance, a host of innovative companies are now using data from these foundational systems to apply artificial intelligence, machine learning, and cloud computing.

One company that GS Growth has invested in—LeanTaaS—uses data and artificial intelligence to help healthcare systems improve efficiency in operating rooms and infusion suites. LeanTaaS enables systems to optimize use of their assets (equipment, staff and facilities), which increases patient access, reduces costs by using staff more efficiently, and lowers patient waiting times, which improves patient satisfaction. The widespread adoption of EMRs has accelerated the emergence of solutions such as LeanTaaS since health systems have an enormous amount of valuable data in their systems. They can leverage this data to create sophisticated algorithms that balance demand and supply, and provide prescriptive recommendations to front-line staff on a near real-time basis.

We also have an investment in Tracelink, which has created the leading digital network to track pharmaceuticals as they move from the point of manufacture to the patient. This enhanced tracking has helped the pharmaceutical industry dramatically reduce prevalence of counterfeit drugs in the system, and enhance patient safety. The data that Tracelink captures across the drug distribution chain also enables its customers to meet global regulatory requirements. In addition, TraceLink has built a digital network platform that facilitates enhanced supply chain visibility and intelligence, enabling customers to derive clear business value from the data being tracked.

Similarly, we have an investment in PaigeAI which is using machine learning and artificial intelligence to create diagnostic tools that increase the speed and accuracy of cancer detection in solid tumors in the clinical pathology setting. It is delivering these tools together with data partners such as Memorial Sloan Kettering. Paige is also using its AI technology to develop digital pathology, AI-driven biomarkers by leveraging the large cancer databases of its partner institutions. Such innovations allow tumor mutations and grading to be assessed in real time, with the initial clinical pathology, rather than having to wait for more costly tests with longer turn-around times.

In addition to our existing investments, we see continued opportunity to invest in companies that are using data to improve healthcare outcomes or improve efficiency. As consumers move to the center of healthcare, there is significant focus on building patient-centered care models and more personalized approaches to care. One example of this is what innovative companies are attempting to do with real world evidence (RWE), which includes drug interaction and patient outcome data captured in the field. We believe RWE is one of the most exciting areas in digital health, as it sits at the intersection of multiple trends, and offers a compelling value proposition to all major stakeholders in the ecosystem. In particular, pharmaceutical companies can accelerate feedback loops on existing drugs to help development of new drugs, and inform efforts to make administration of the drugs more precise. Payors can use real world outcome data to inform their reimbursement models.

Companies that provide interoperability and communication technology solutions specific to healthcare are also well positioned, however a number of factors have hindered their progress. These include a lack of standard data definitions and transfer protocols, a lack of incentives for stakeholders, and difficulty seeking patient consent.

Optimism about addressing these challenges rose in March 2020 thanks to new regulations from the Centers for Medicare & Medicaid Services (CMS) and Office of the National Coordinator for Health Information Technology (ONC). These rules support seamless access, exchange, and use of electronic health information. The CMS rule will require hospitals to send electronic notifications to other providers when a patient is admitted, discharged, or transferred, as well as require CMS-regulated payers and agencies to offer open APIs that allow information sharing between patients, providers, and payers. The

ONC rule finalized new standards (i.e., HL7[12], FHIR[13]) and data elements (i.e., USCDI[14]) for APIs. The rule also implements a new provision of US law that prohibits providers, EMR developers, and health information exchanges from blocking access to information. Penalties for violations can be up to $1 million. These shifts have the potential to create both new data modalities as well as ecosystems that can unlock new sources of value.

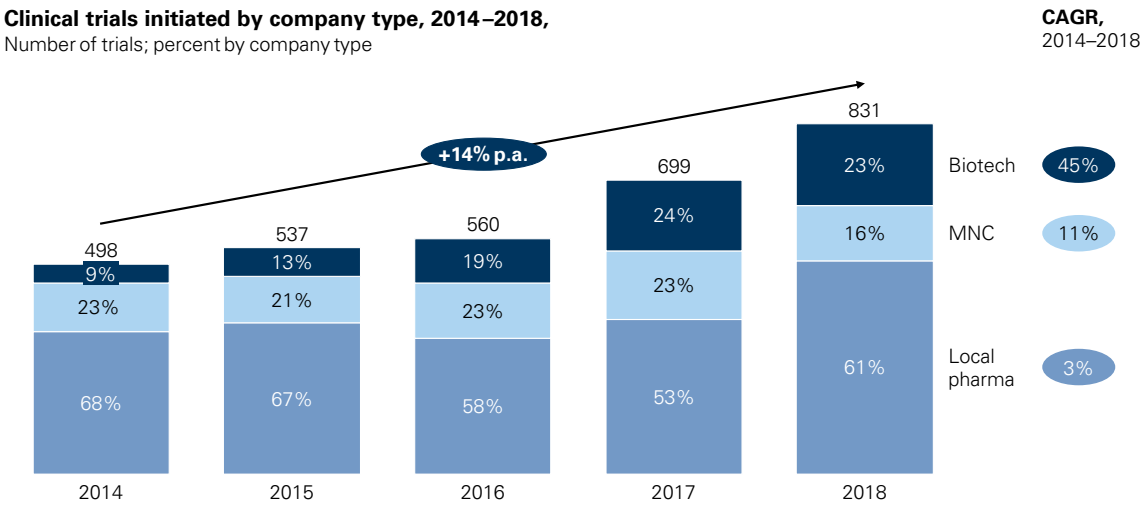
4.4 Growing contractual outsourcing

R&D outsourcing is an important aspect of the healthcare industry across geographies. In 2019, global R&D spend reached $182 billion, of which 40 percent-to-50 percent is outsourced. Of that amount, clinical-stage contract research organizations (CROs) represent the largest segment, accounting for over $40 billion in 2019. Across the globe, Asia, and China in particular, have been driving the growth of this market, and providing more opportunities for investors. China's clinical stage CRO market reached about $3.7 billion in 2019, growing at 29 percent CAGR over the previous 5 years.

The strong drive for innovation in Chinese life sciences, combined with the country's large market potential, have prompted local and multi-national players across pharma, biotech and medical devices to spend more money and time on clinical development in China. Clinical trials in China grew at a 14 percent CAGR from 2014 to 2018, with biotech leading the way at around 45 percent CAGR. Local pharma was still the largest segment, however, representing around 60 percent of the market. (Exhibit 16).

Exhibit 16

Clinical trials in China have been growing steadily, driven by biotech



Source: Industry consultants

[12] Health Level 7, a set of international standards for transfer of clinical and administrative data between software applications used by various providers
[13] Fast Healthcare Interoperability Resources, a standard describing data formats and elements and an application programming interface for exchanging EHRs
[14] United States Core Data for Interoperability, a standardized set of health data classes and constituent data elements for nationwide, interoperable health information exchange

Another important driver of this growth was China's accession in 2017 to the ICH[15]. This membership is prompting the convergence of China's clinical standards with global norms, paving the way for multi-national pharma companies to conduct multi-regional trials inside and outside China. This will shorten time-to-market for new drugs, and lower the market entry hurdle for MNCs. Lastly, Chinese pharma companies are today much more focused on drug quality after a series of government-led efforts to improve clinical data integrity issues and implement good clinical practices (GCPs).

All of this means more business for CROs that can deliver an international GCP experience, global perspectives, and local access. After 30 years of development and consolidation in the global CRO industry, the top 10 players now represent 40 percent-to-50 percent of the market. In China, however, the clinical CRO space is still fragmented. The top 5 players have only a 31 percent market share, making the sector ripe for consolidation.

Among the CRO companies that have received investments from GS Growth is **ClinChoice Inc.** (previously known as Fountain Medical Development). Founded in 2007, ClinChoice is the No. 2 domestic clinical stage CRO platform in China by revenue, providing clinical trial services to MNCs and local pharma clients. It has about 1,800 employees across eight countries, covering all lines of work, from clinical operations, to biostatistics, regulatory affairs, and pharmacovigilance. ClinChoice has completed over 770 clinical studies through collaboration with 250-plus pharma clients and 300-plus clinical institutions and hospitals.

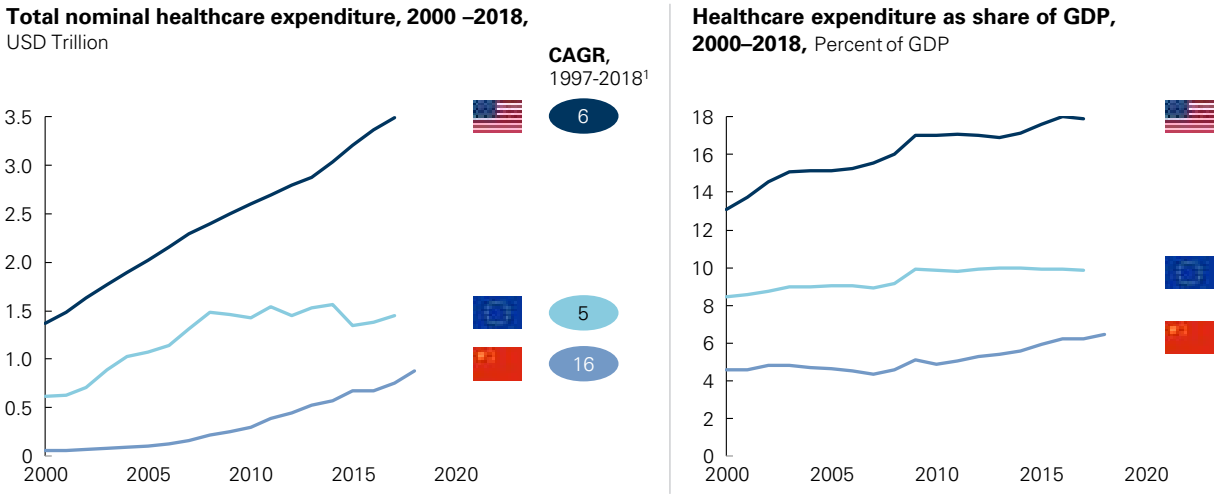
4.5 Bridging the therapeutic gap between developed and emerging markets

Substantial gaps still exist between the west and east across key aspects of healthcare. These include the number of medicines available, therapeutic efficacy, and treatment quality. One reason is lower spending on healthcare by some of the governments in the region. For example, China's healthcare spending is about 6 percent of GDP, compared to nearly 10 percent for the European Union and almost 18 percent for the US (Exhibit 17).

[15] International Council for Harmonization of Technical Requirements for Pharmaceuticals for Human Use

Exhibit 17

China runs behind in the healthcare space compared to the US and Europe; innovative companies are contributing to bridging this gap



1. US and EU expenditure number is from latest 2017 World Bank data

Source: World Bank; WHO; China Statistical Yearbooks; US CDC

In addition, China has almost 25 percent fewer physicians per capita than the US, and almost 80 percent fewer nurses per capita, even as it has about 60 percent more hospital beds per capita.

The gaps in availability of medicines and treatments in China have been driven by a systematic lag in therapeutic launches. On average, healthcare brands are typically launched in China more than 4 years after their launch in the US.

Gaps exist across several therapeutic areas. One example is diabetes, where Chinese per capita spending was about $80 in 2019, a fraction of the $900 spent in the US. A major gap also exists in space for medical procedures. For instance, in 2019, only 0.1 percent of Chinese people over 50 had hip or knee surgery, compared to 0.7 percent and 1.1 percent respectively, in the US.

A number of innovative companies have launched in China to bridge these gaps and improve healthcare offerings for millions of patients. GS Growth has led many of these investments.

Gan & Lee Pharmaceutical is an example. China has more than a quarter of world's diabetes patients, with 116 million cases, and a prevalence rate of over 10 percent of the population. Patients are expected to continue growing to reach 140 million in 2030 and close to 150 million in 2045. More than half of these cases remain undiagnosed, and until recent years, many patients still relied on an older generation of treatments. In 1998, Gan & Lee developed Gansulin, China's first recombinant human insulin, an important breakthrough. It was also the first to develop a third-generation insulin product for China. Third-generation products improve upon previous drugs, and are expected to replace second-generation products, and meet the unmet medical needs of diabetics in China. The market size of diabetes drugs in China exceeded $3 billion in 2019.

Another area in which GS Growth has invested is cardiovascular disease, cause of nearly 18 million deaths each year, and the number one cause of death globally. Aortic stenosis is a type of cardiovascular disease affecting around 2 percent of people over 65 and 4 percent of people over 85 in the western world, and with an estimated 1.5 million patients in China. While the US and Europe have migrated towards minimally invasive TAVR procedures (transcatheter aortic valve replacement) to treat the disease, Chinese patients still had to undergo open heart surgery until recent years. GS Growth has invested in Venus Medtech, the leading structured heart-focused medical device player in China with a first-to-market TAVR product launched in 2017.

final thoughts

While our individual investment perspectives will continue to evolve across each of our sectors the macro-trends and core themes provide a foundation for our thinking. Growth equity investors will do well to acknowledge the drivers that allow hyper-growth companies to meet latent consumer demands, overtake or challenge incumbents, and protect or improve the efficiency of business ecosystems. As leaders in the growth equity market, we are extremely encouraged by the investment opportunities that exist today and into the future. We look forward to regularly updating the industry on our thinking.

sources

Introduction to Goldman Sachs Growth

Analysys Mason

Bank of America

China Ministry of Commerce, "China E-commerce Report 2019"

eMarketer, "China Ecommerce 2020," June 2020

Forrester Analytics

IHS

McKinsey, China digital consumer trends 2019, September 2019

Moody's Analytics

Periscope by McKinsey, "Retail reimagined: The new era for customer experience," August 2020

Pew Research, Millennials overtake Baby Boomers as America's largest generation

Preqin Ltd

Strategy Analytics, Global Smartphone User Penetration Forecast by 88 countries: 2007–2025

Department of Commerce

US census

Continued digitization of financial products and asset classes

Better.com

Ellie Mae September 2020 Originations Insight Report

McKinsey, "Competing on customer experience in US mortgage," December 2019

McKinsey, Global Private Markets Review 2020

McKinsey, 2018 Retail Banking Customer Experience Survey

Mortgage Bankers Association

New York Times, "Is an Algorithm Less Racist Than a Loan Officer?" September 18, 2020

Preqin Ltd.

Rocket Companies S-1

World Bank

World Federation of Exchanges

Enabling digital transformations of financial institutions and insurance companies

Dealroom

Gartner, "Forecast: Enterprise IT Spending for the Banking and Securities Market, Worldwide, 2018-2024, 2Q20 Update," August 2020, https://www.gartner.com/en/newsroom/press-releases/2020-08-12-gartner-forecasts-worldwide-banking-and-securities-it

McKinsey Finalta Insights

McKinsey Global Banking Pools

McKinsey Panorama Fintech

Oracle, https://www.oracle.com/a/ocom/docs/industries/financial-services/evolve-business-model-modern-core-platform-wp.pdf

Embedding of financial services within software and marketplace solutions

American Express Company, 2019 Investor Day

McKinsey, "Competing in a world of sectors without borders," July 2017

McKinsey Global Banking Pools

McKinsey, "Insurance beyond digital: The rise of ecosystems and platforms," January 2018

McKinsey Payments Map

McKinsey Proprietary Tools (Finalta Small Business Data, GCI, GFIC, 2017)

Shopify Q2 2020 Press Release

The evolution of fintech in Asia

McKinsey Global Insurance Pools

McKinsey Global Payments Map

McKinsey, Global Payments Report, 2020

TechCrunch, Jack Ma's fintech giant tops 1.3 billion users globally, July 14th, 2020

Tencent, Q2 2020 results

Moving the enterprise to the cloud

Gartner, "Forecast: Public Cloud Services, Worldwide, 2018-2024, 2Q20 Update," July 2020; Statista

Gartner, "Market Share: Enterprise Public Cloud Services, Worldwide, 2019," July 2020; Statista

IDC

IDC Worldwide ICT Spending Guide, IDC Worldwide Public Cloud Services Spending Guide, 2018–23

McKinsey proprietary CIO survey

McKinsey, "Securing software as a service," September 2019

McKinsey, "The next software disruption: How vendors must adapt to a new era," June 2020

Netscout / IEE Cloud Computing Survey 2018

Re-imagining enterprise applications

CIO.com, COVID-19 accelerates enterprise use of automation in digital transformation, June 16, 2020

Forrester

Gartner, Forecast Analysis: Robotic Process Automation, Worldwide, September 2020, https://www.gartner.com/en/newsroom/press-releases/2020-09-21-gartner-says-worldwide-robotic-process-automation-software-revenue-to-reach-nearly-2-billion-in-2021

Gartner: Magic Quadrant for Enterprise Low-Code Application Platforms

IDC

McKinsey Global Institute, "A future that works: automation, employment, and productivity," January 2017

US Bureau of Labor Statistics

The digitization of the enterprise

eMarketer, Global Ecommerce, 2019

McKinsey, China Digital Consumer Trends 2019, September 2019

McKinsey, COVID-19 China Consumer Pulse Survey 9/16–9/24/2020

McKinsey, COVID-19 US Online Grocery Consumer Survey 9/18–9/23

Salesforce

Protecting the enterprise from evolving cyber threats

Hiscox Cyber Readiness Report 2020

IBM, Cost of a data breach report, 2020

IDC Security Spending Guide (2019 and 2020)

Mordor Intelligence

Reallocation of leisure time

Analysys Mason

ITU (International Telecommunication Union), 2019

National Bureau of Statistics of China, 2018 National Time Use Survey, aged 15+

NewZoo Global Games Market Report 2020

OECD/Eurostat, Harmonized Time Use Survey 2014/15, ages 15-64

Peloton, Shareholder Letter, Q4 2020, September 2020

Qianfan analysis

Qustodio, Connected More than Ever: Apps and digital natives: the new normal, May 2020

Strategy Analytics

US Bureau of Labor Statistics, American Time Use Survey, 2019, Aged 19+

Unbundling of broad online communities into vertically focused platforms

Facebook Second Quarter 2020

Fangzheng Analyst Report

Omnicore Digital Marketing Agency

SullyGnome

The rise of mission-driven brands and sustainable business models

Global Consumer Confidence Survey conducted in collaboration with Nielsen Q2 2017; McKinsey 2017–2020 Global Sentiment Survey

Harvard Business Review/NYU (Whelan and Saccco, 2018)

McKinsey, Consumer sentiment on sustainability in fashion, July 2020

McKinsey, 2020 Global Sentiment Survey

McKinsey, US Consumer Pulse Survey 7/30–8/2/2020, and 7/7–7/12/2020

Nielsen 2018, "Actually consumers do buy sustainable products"

Digitization of consumer services

eMarketer, Global Ecommerce 2020, May 2020

McKinsey, COVID-19 China Consumer Pulse Survey, 6/15–6/21/2020

Enabling e-commerce acceleration through infrastructure technology and logistics

CB Insights

China MOFCOM, "China E-commerce Report 2019"

Crunchbase

eMarketer, Global Ecommerce 2019; Global Ecommerce 2020

iResearch

McKinsey, China Digital Consumer Trends 2019, September 2019

McKinsey, Startup funding in Logistics, May 2020

McKinsey, "The endgame for postal networks: How to win in the age of e-commerce," May 2019

Overview of the healthcare space

McKinsey, COVID-19 Consumer Survey, 4/13/2020–4/27/2020

McKinsey, COVID-19 Consumer Survey, May 20, 2020

McKinsey, COVID-19 US Consumer Pulse Survey, 8/19–8/23/2020

McKinsey, Telehealth: A quarter-trillion-dollar post-COVID-19 reality?, May 29th, 2020

Stackline as of 8/22/2020

Accelerating the consumerization of healthcare, and the shift to value-based care

KFF

McKinsey, Consumer Health Insights Survey 2018

National Health Interview Survey

US CDC

US Census Insurance Survey, September of each year

WHO

World Bank

Developing innovative delivery methods, including virtual health

McKinsey, COVID-19 Consumer Survey, 4/13/2020 to 4/27/2020

McKinsey, Global COVID-19 consumer survey, 6/8/2020, 7/14/2020

McKinsey Global Institute

McKinsey, Telehealth: A quarter-trillion-dollar post-COVID-19 reality?, May 29, 2020

Utilizing data to improve efficiency and quality of care Growing contractual outsourcing

Evaluate Pharma

Fitch Ratings, US Pharma Contract Research Organization Demand Will Resume in 2H20, September 8, 2020

Frost & Sullivan, published on HKExnews https://www1.hkexnews.hk/listedco/listconews/sehk/2020/0728/2020072800013.pdf

Industry Standard Research (ISR)

Bridging the therapeutic gap between developed and emerging markets

CDE

China Statistical Yearbooks

EvaluatePharma

GBI

International Diabetes Foundation

Millennium Research Group

Novo Nordisk, Investor Presentation Q4 2019

OECD

Sina Med

Statista

"Transcatheter Treatment of Aortic Stenosis and Regurgitation," July 6, 2020

Transmedia

US CDC

WHO

WHO on Cardiovascular diseases, https://www.who.int/health-topics/cardiovascular-diseases/#tab=tab_1

World Bank

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